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**PhD THESIS**

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**CALL/Educational Technology**

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**ITSICALL:**

**INVESTIGATING**

**TEACHING STRATEGIES**

**IN**

**COMPUTER ASSISTED**

**LANGUAGE LEARNING**

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**Submitted on December 15th 1994**

**Examined on March 3rd 1995**

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**INVESTIGATING TEACHING STRATEGIES**  
**IN COMPUTER ASSISTED LANGUAGE LEARNING**

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## **ACKNOWLEDGMENTS:**

I wish to dedicate this thesis to my parents, Claude and Francine Lecompte, my stepmother, Therese and my partner, John Stean, who have been invaluable in providing moral, emotional and financial support to this enterprise and have not been able to see as much of me, especially during the writing stage. I wish to also thank my partner and his cat "Ronron", who have constantly alleviated the stress by their love, patience, understanding and constant attention, and his family for encouragement.

This thesis was initially funded as a SERC (Science and Engineering Research Council) studentship, supplemented by the Open University. I wish to thank profusely the clerical and academic staff of the Institute of Educational Technology (IET) always treated their post-graduate students with great respect and understanding and were always willing to help, creating a congenial and flexible environment in which to study, and providing the training and required facilities. Particular thanks go to Olwyn Wilson, Pat Cross, Di Mason, Dave Perry and last but not least, Hansa Solanski.

Similarly, the staff at the NCCALL at Ealing College of Education, now Thames Valley University and the CTI Centre for Modern Languages at Hull University have also played a vital role, by making me feel welcome to explore their software and facilities. I have also made great friends and received much encouragement at the various Eurocall conferences I attended.

I also wish to thank the higher management of the school of Education and Health Studies at South Bank University (SBU), especially Professor Gaby Weiner, who, on my appointment as a senior lecturer, on the PGCE course, allowed me a day a week to complete the writing of my thesis. The language department at SBU also offered help and support, especially Teresa Lawlor and Paul Bangs.

The research was conducted in three London secondary schools, Central Foundation for Boys, Islington Green and Elizabeth Garrett Anderson, whose heads of department, Michael Brynn, Monica Austin and Doreen Piquemal, agreed to co-operate with the research kindly let me withdraw children from their classes or made arrangements for the preliminary study and the testing of the program. The 50 children who participated in some of the research were on the whole very dedicated and interested.

After completion of the first draft, most of the chapters were sent to selected readers all over England, who sent back valuable comments to help improve the contents and form of these chapters. Special thanks go to Clive Matthews (UEA), Graham Davies (Thames Valley), Helen Mulphin (Open University), Paul Bangs (South Bank University) and Paul Hickman (Southampton University), for their time, encouragement and interest. My partner John Stean also kindly helped with the general sense and style of the whole of the thesis.

My greatest thanks must go to the best of supervisors, Diana Laurillard, whose support, sympathy, dedication, clarity of vision stretched beyond the call of duty and whose level of professionalism, organisation and enthusiasm I would wish one day to be able to emulate. Diana has not only been supportive, constructive, patient, enthusiastic but also shown great personal warmth.

Thierry Chanier was also the best external supervisor I could have possibly hoped for, who has provided extensive comments on the first draft, kept an active interest in my research and become a friend, and with whom I would like to co-operate in the near future.

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## **THESIS ABSTRACT:**

### **INVESTIGATING TEACHING STRATEGIES IN COMPUTER ASSISTED LANGUAGE LEARNING:**

This thesis evaluates the effect on the learning and teaching of gender and gender agreement in French for English speakers of various teaching strategies Implicit, Explicit and Exploratory, implemented as a CALL program, 'Itsicall' (Investigating Teaching Strategies in Computer Assisted Language Learning).

It is an original piece of research with school children in London which uses a variety of L2 research methods, i.e. error analysis, contrastive analysis and learner interviews, to inspire the design of the computer program, which teaches the concepts of Gender and Gender Agreement in French in the three modes selected, Implicit, Explicit and Exploratory.

The design of the gender teaching program was motivated by a series of preliminary investigations, which lead to the accumulation of a rich source of data on the way school children perform and acquire concepts prominent in another language and provides many insights into the difficulties encountered by children trying to grapple with the concept of Gender, under represented in the English language and primordial in French.

The program was then tested and evaluated in an exercise which provided further invaluable data for Second Language Acquisition Research, Second Language Teaching and Computer Assisted Instruction, taking into account the answer to the original research questions and the opinions of the children who tried out the program.

The account of this empirical work, which reveals the potential of exploratory computer environments is then followed by an analysis which incorporates all the findings of the previous experiments into a critical evaluation of the merits of Implicit, Explicit and Exploratory teaching of grammar rules in a CALL environment.

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## **INTRODUCTION:**

As a native speaker of French, having learnt English as a second language in French lycées and settled to work and teach my native language in the United Kingdom to native speakers of English, I have always been fascinated and puzzled by the difficulties experienced by these native speakers when learning French or any other language. This has led me to study linguistics and language acquisition in an attempt to solve this puzzle and to try and help native speakers of English learn and acquire the basic structures of the French language. I have also had extensive experience of teaching French with the 'communicative' methodology for nearly 15 years and I have also come to realise the potential of computers in aiding this learning process. Therefore, I gave up my job as a French language teacher and head of department to carry out research into the ways computers could assist the second language acquisition process. This thesis is the result of the research undertaken.

My greatest puzzle is to find out the reason why every human being learns their first language effortlessly and without formal teaching while many find it difficult to achieve a basic communicative level in a second language or even relative fluency, even in immersion programmes. This is such a big puzzle that should involve teams of researchers for many years. This thesis is designed to contribute to the investigation of this issue by focussing on the learning problems and alternative teaching strategies for one aspect of a language. It concentrates on French syntax, with a view to evaluate the potential of the use of computers in helping the learners overcome some of their learning problems.

First languages are learnt inductively, whereas proficiency in a second or other languages usually involves some kind of formal teaching. This formal instruction can vary in terms of the methods used, the emphasis it places on the role of grammatical rules and structures



of a target language, on the accuracy required in the production of these structures and on the opportunities it gives the learners to practise their communicative and grammatical skills.

With the advent and popularity of 'communicative' language teaching, the emphasis of the tuition has shifted from conscious learning of the rules of a language to more experiential, inductive learning. What has become important is to provide the learners with opportunities to practise and communicate in the target language. The National Curriculum recognises that knowledge of rules and structures is essential and recommends a new approach to raise the awareness of these rules and structures, an 'Exploratory' approach, which allows the learners to discover the rules, and only provides an explanation or practice as and when they are ready. This approach both contrasts and subsumes the other two, the more traditional didactic 'Explicit' approach, in which the rules are presented, explained and practised according to a set programme, or the more controversial 'Implicit' approach which attempts to mirror more closely the conditions of first language acquisition and does not attempt to teach these rules and structures explicitly. With the latter the learners are left to guess the rules contained in the chunks of language presented to them. This laissez-faire 'Implicit' approach has been criticised for the greater lack of grammatical accuracy observed in the learners, thereby impairing their ability to communicate at a higher, more subtle level.

Even though the National Curriculum for Modern Foreign Languages has recommendations to make about the strategies to teach grammar and the structures and rules of a second language, very little justification is offered as to why the 'Exploratory' approach should be preferable and there has been little rigorous testing and evaluation of the three approaches, and of their relative merits. This testing and evaluation is very

difficult to perform in a classroom environment as so many factors enter into play and human teachers cannot usually give the same lesson twice, in identical conditions.

Computers and multimedia resources provide a richer, more flexible learning environment for rules of syntax and vocabulary than textbooks and appear to give teachers greater flexibility in the design of teaching materials. They also have a good research potential, because they record information accurately and can be used to model different learning environments, stable and consistent for each learner. Therefore, we decided to utilize computers to test the relative merits of three teaching approaches, 'Implicit', 'Explicit' and 'Exploratory', with a computer program, formalizing these and operating in these modes.

Starting from a second language (L2) acquisition perspective in chapter 1, as advocated by Cook (1991:152), because it would "lead to a more scientifically-based view of language teaching", we then looked at second-language teaching, with and without computers, with particular reference to the teaching of syntax, consciousness raising of the grammar rules and greater learner autonomy in chapter 2. This gave rise to the idea of designing a prototype CALL program to test the three teaching strategies currently referred to in the literature: 'Implicit', 'Explicit' and 'Exploratory'. It was then necessary to find an appropriate domain in which to explore the merits of these three teaching approaches and this domain was provided by the results of an error analysis performed on the scripts of GCSE candidates, which showed that the acquisition of French gender system seemed to cause a lot of problems to our learners. This problem was further investigated through a closer look at the literature on gender and a preliminary analysis testing out some of our hypotheses, described in chapter 3. We then proceeded with the design and implementation of a prototype computer program, 'ITSICALL', acronym for 'Investigating Teaching Strategies In Computer Assisted Language Learning', described in chapter 4. Chapter 5 deals with the testing and evaluation of the program, describes the

testing procedure, and provides examples of the sessions experienced with two totally different learners and an initial discussion of the problems they encountered, either with the program or with the concept of gender in French. In chapter 6, we recount how we compiled the results and make comparisons between the three modes using the scores obtained by the learners and their answers and comments during the sessions and interviews. Chapter 7 attempts to provide an explanation for the results in terms of linguistic theory, language teaching and CALL program design and draws implications for further improvements and further research.

## **1. LANGUAGE ACQUISITION THEORIES AND RESEARCH AREAS:**

Every human being manages to learn a language and its basic structure without being presented with a grammar of this same language as a formal system. This fascinating fact raises fundamental questions about the mental structures that enable language acquisition, with special reference to the acquisition of syntax:

- What are the learning processes involved, in first language acquisition and, subsequently, in the acquisition of second and other languages?
- Are these strategies and processes specific to language learning or is language learning just a special case in human development and maturation?
- What are the cognitive processes involved in language learning and are these processes the same for first language acquisition and second-language learning?
- What are the implications for second language teaching?

First of all there is a need to comment on the distinction between 'learning' and 'acquisition', terms which are not always used consistently by researchers and theorists. Both terms can be defined either in terms of the processes (subconscious/conscious) involved in mastering a language or of the conditions of the learning (naturalistic/structured) as exemplified by the definitions below:

'Learning' is used :

- in connection with behaviourist theories of 'learning';
- to denote "a conscious process that results in 'knowing about language' " (Krashen, 1985:1)
- or "conscious study of a second language" ( Ellis, 1985 : 6);



- when the learners of a language are exposed to language through structured teaching (Wilkins,1974:26);

The term 'acquisition' has been found to denote:

- the process of acquiring mastery of a language (Hyams,19861), (Klein,1986:3), connected with the main concepts of the theories of Universal Grammar and Government and Binding (UG/ GB), explained in greater detail in 1.1.2.;
- "a subconscious process identical in all important ways to the process children utilize in acquiring their first language" (Krashen,1985:1);
- the subconscious or conscious processes by which languages are learnt (Ellis, 1985:6);
- language 'learning' resulting from natural and largely random exposure to language (Wilkins,1974:26).

Therefore,'learning' tends to be used to denote either behaviour or conscious study of rules in a more formal environment, i.e. in classrooms, whereas 'acquisition' refers to a process leading to mastery, usually subconscious, in which there is little or no explicit teaching of the rules of syntax. As these distinctions are neither universal nor uniform across the literature, we will emulate Ellis (1985:6) and use the two terms interchangeably as they appear in the original sources, unless otherwise stated.

The strategies involved in 'learning' may or may not be domain specific. Behaviourism, as a general theory of learning, will study the processes and strategies by which a particular individual arrives at the mastery of a given skill. Different processes may be at play in the acquisition of some of these skills; some are more complex than others and depend upon the pre-existence and mastery of other more general skills achieved during the learning process.

In language learning, it will be necessary to make a distinction between the process of learning a language to its full mastery, i.e. the language acquisition process, and the knowledge acquired, the product of that process, the competence of the speaker/hearer, or their knowledge of language. Acquisition of a language also presupposes tacit knowledge about the structure of that particular language assumed necessary to understand or speak it.

First language acquisition is always successful for all individuals, whereas many have problems learning another language. The study of the processes and mental structures involved in first language acquisition could possibly inform the learning of second and subsequent languages. This, however, raises further questions:

- Can first and second language acquisition be compared?
- Do the same conditions apply or are the situations and processes involved different?
- What are the implications for language learning and teaching?
- Can languages be taught or can they just be acquired once the right conditions and the right situation are present?

These questions will also be examined by considering existing research on both first language acquisition (FLA) and second language acquisition (SLA), and also in what is more appropriately referred to as second language learning (SLL).

### **1.1. First Language Acquisition:**

For first language acquisition, the process leading to the mastery of the first or native language, 'behaviourism' and 'connectionism' are theories concerned with the environment or conditions of the learning, whereas 'mentalist and cognitive' theories prefer to

concentrate on the mental processes used by the learners to sift through the linguistic data they are confronted with.

#### **1.1.1. The behaviourist/mentalist debate:**

The first theories of language learning were behaviouristic (Skinner:1957), but there has been an evolution towards a more mentalistic approach to language learning, with the advent of transformational generative grammar of Chomsky and its later versions (Government and Binding theory or GB) and the emergence of the procedural approach, still mentalistic in its outlook.

To describe and explain learning behaviour, Behaviourist theories are based exclusively on observable behaviour, whereas Mentalistic theories rely on the structure and mechanisms of the mind of the learner. The Behaviourist theories of learning focus mainly on the role of the environment, both verbal and non-verbal. Behaviourist and Connectionist learning theories are concerned with the description and explanation of language behaviour using a stimulus-response model, by establishing a connection between a stimulus or stimulus situation and an organism's response to this stimulus. The emphasis is on behaviour which can be learned by both humans and animals and no allowance is made for non-observable human factors, such as plans, intentions and attitudes, which are to be excluded from the scientific analysis of behaviour.

Skinner (1957) attempted to analyse language behaviour by tracing the factors influencing that behaviour, described in terms of stimulus and response, each utterance following on some sort of verbal or non-verbal stimulus, i.e. a stimulus situation causing somebody to respond with an utterance. Language behaviour could only be studied through the observation of the environment of the language user and of external factors. Such external

factors involved the frequency with which a certain utterance was used in the child's environment, through imitation of the language heard, and the reinforcement needed to arrive at greater proficiency, i.e. parental approval.

Chomsky reacted strongly against Skinner's conception of verbal behaviour, by arguing that human behaviour is considerably more complex than animal behaviour and that some language behaviour is so specific to humans that it could never be explained in terms of animal behaviour. According to Chomsky (1980), a description of external stimuli and resulting responses cannot explain adequately language behaviour. Furthermore, Chomsky also questioned the relevance of Skinner's theoretical concepts and demonstrated that the conclusions Skinner had obtained from laboratory experiments could hardly lead to an explanation of human behaviour, let alone language behaviour.

Three key arguments were used in the debate: that the input available to the first language learners is imperfect, that language behaviour is not 'imitative' and that the 'frequency of stimulus' and reinforcement are insufficient to support a behavioural approach.

For the mentalists, the first language is acquired naturally, by induction. The child is exposed to a definite number of utterances of the language, from which he/she has to deduce the rules that make up the set of grammatical or acceptable sentences of the language of the community he/she is living in. The child arrives at a mental representation of the rules of his/her language from an imperfect set of data. More often than not, even the adult speakers themselves make performance errors and there are many individual variations in accents, dialects and structures used by the adults around them. First languages are acquired without an explicit formulation of the rules of the language, which the adults themselves may not know consciously, and without a systematic correction of



the errors made by the children. This 'poverty of input' argument leads researchers to wonder how it can be possible that all children manage to perform such a mammoth task?

The task itself appears colossal and is achieved in approximately 9000 hours of exposure to a normal linguistic environment between the ages of one to six. (McLaughlin,1987:46). Miller (1964:299) showed that there would not be sufficient time for the L1 learner to master his mother tongue by stimulus and response alone, as the number of possible sentences in English we could generate from a mere 20 word vocabulary, reaches 10 to the power of 20. It would be impossible for any learner to have ever heard or practised all those sentences. Therefore learning a language is more a matter of creativity and analysis than mere repetition and practice.

Furthermore, children's language behaviour, according to Chomsky, cannot be reduced to imitation. Though children imitate words and structures produced in their environment, they also produce systematic deviant forms thereby showing examples of rule-governed behaviour. Studies by Brown et al (1964) have shown that the acquisition of syntactic rules cannot be reduced to passive imitation, since children produce original simplified structures of their own which obey certain functional requirements, such as the conservation of a minimum of necessary information and the tendency to add to this minimum. Systematic deviations include over-generalisation, i.e. extension of the domain of a certain linguistic rule as in 'mouses', 'mans', 'comed' and 'goed'.

Evidence gathered from the study of the acquisition of negative/interrogative sentences in English also shows that children proceed in their own way towards the acquisition of adult structures (Clark & Clark,1977:347-51), through steps ranging from sentence external negations: 'No sit there', 'no wear mitten', to sentence internal negations: 'that fish no school', 'You can't dance' and finally command of essentials of the adult system as in

'Paul didn't laugh', 'That was not me'. Moreover, children's utterances also deviate from the adult norm by often deleting function words and word endings, as in 'He no like water', 'Johnnie want cat?' and 'Cat chasing dog'. None of these cases could be explained by pure imitation and it appears that children creatively filter out the elements they themselves cannot handle.

The frequency of stimulus argument, which states that the more often the children are exposed to a particular word or structure and the more opportunities they have to repeat/practise, the more quickly this word or structure will be acquired, is to be discounted on several grounds:

- The verbs most frequent in adult speech are irregular verbs, which possibly explains why these verbs often resist regularisation and yet, in spite of their frequency of occurrence are not imitated by the child but are often subject to over generalisation, as he/she produces systematic innovations, as in 'comed' and 'goed'.
- The most frequent category of words in adult speech is that of function words, which are often monosyllabic, monophonemic and unstressed and do not emerge in the child's speech until quite late in its development. The order of acquisition of 14 grammatical morphemes in Brown's study (1974), which was found quite similar for all children does not match the frequency of use of these morphemes in adult speech. Therefore frequency of occurrence in adult speech cannot predict the order of acquisition or explain it.

Finally, for the Behaviourists, parental approval is seen as the most important type of reinforcement in the language learning process. However, Brown et al (1968) argued that the parental response and feedback on children's utterances is often more related to the truth-value of their children's statements than to their grammatical acceptability. Parents

usually offer positive reinforcement and do not necessarily correct grammatical errors systematically. They are basically interested in communicating with their children.

Moreover, communication does not seem to be impaired between parents and children, even when the latter use only a primitive linguistic system. Children also progress to more complex utterances at a later stage without parental disapproval of their earlier more primitive statements.

The Mentalists' theoretical assumptions therefore focus on the innate capacity of any child to learn any language and the processes involved in the acquisition of language. If we are to believe the Chomskyists, there is more to language learning than a simple process of stimulus/response, involving input, imitation and repetition, frequency, practice and reinforcement through corrections and rewards, since learners are capable of forming an infinite number of new sentences, not necessarily heard or produced before.

#### **1.1.2. Chomsky's transformational generative and government and binding approach:**

In addition to their critique of behaviourism, Chomskyists also argued that a better understanding of the linguistic system learned was a prerequisite to the study of the language learning process. This gave the child a more prominent role in the learning process and inspired a variety of experiments in language-learning research, which generated some key concepts for understanding FLA, the innateness hypothesis, Universal Grammar, the setting of parameters, and markedness.

In Chomskyan theory, the ability to learn languages is innate to human beings. The term 'acquisition' is to be preferred, referring to ideal language learning unaffected by

maturation, processing limitations, memory restrictions and other cognitive and motivational factors (McLaughlin,1987:93).

Chomskyan theory is concerned with grammatical competence, i.e. the speaker's knowledge of the language. Certain principles of the human mind are biologically determined and specialized for language learning and it is assumed that the first language learner comes equipped with innate specific linguistic knowledge of "Universal Grammar", taken to be "the set of properties, or conditions, that constitute the 'initial' state of the language learner, hence the basis on which knowledge of language develops." (Chomsky, 1980:69). The abstract and linguistically significant principles of Universal Grammar underlie all natural languages and include the essential faculty for language with which all individuals are equally endowed, referred to as the Language Acquisition Device (LAD). Therefore all languages, including the language of learners are constrained by the principles of UG.

For Chomsky, language acquisition is a subconscious process, in which the child starts with all the principles of Universal Grammar. The child makes hypotheses about the structure of language in general and the particular language he/she is learning through the Language Acquisition Device, a mentalistic structure. He/she builds the best grammar possible on the basis of what is cognitively possible at a given point in time, sets up hypotheses, tests them in its use of language, and matches and revises these hypotheses in the light of the new linguistic input available in its immediate environment. He/she develops a rule system which changes systematically until the adult system is mastered.

One such universal principle is the principle of 'structure-dependency', a principle common to the syntax of all languages, "which asserts that knowledge of language relies on the structural relationships in the sentence rather than on the sequence of items" (Cook,



1988:2). Thus "the form of English questions does not depend on the linear order of words in the sentence so much as on the syntactic category of the words involved" (id:3). This principle accounts for the fact that, in the following set of examples, (a) is grammatical, whereas (b) is ungrammatical, as "question formation in English involves moving the auxiliary from the main clause to the front" (Cook,id:6):

**(a) *Is the man who is tall John?***

**(b) \* *Is the man who is tall is John ?***

However, knowledge of language does not consist exclusively of invariant principles. There are many variations across the languages of the world. The principles of Universal Grammar also involve a set of properties with certain parameters. Human languages are constrained by the principles and parameters of Universal Grammar. As demonstrated, no human language can be structure-independent. UG "permits only a finite number of core languages" and "there are finitely many parameters and each has a finite number of values" (Chomsky,1986:149). The parameters of UG remain open until they are triggered by the environment. Language acquisition is the process by which the learner sets the values of the parameters of the principles of Universal Grammar.

Well-quoted examples of such parameters include the pro-drop parameter, and the principle of adjacency.

Languages of the world are categorized into 'pro-drop' and 'non-pro-drop' languages, pro-drop being a parameter of Universal Grammar, with a set of implicational properties following from the pro-drop classification. It is also called 'the null subject parameter', which "determines whether the subject of a clause can be suppressed" (Chomsky,1988 :64). The subject of a sentence is compulsory in English or French, but can be omitted in Italian or Spanish, as in:

*I am the walrus (English)*                      *Sono il tricheco (Italian).*      (Cook,1988).

Non pro-drop' languages (English, French and German) also do not allow inversion of the subject and verb in declarative sentences, whereas in 'pro-drop' languages (Italian, Spanish and Chinese), it is possible to find the subject inverted legitimately: "*Cade la notte* " is grammatical in Italian, whereas its literal translation in English: "*\*Falls the night*" is not. Many pro-drop languages are also richly inflected, whereas non-pro-drop languages are not (Cook ,1988:41).

We can also give a brief example of the principle of 'adjacency', "according to which noun phrases must be next to the verb or preposition that gives them case" (McLaughlin, 1987:95). This means that "some languages such as English require case assigners to be adjacent to the NP that receives case" (Cook,1988:142-3), whereas French does not, as in:

*"J' aime beaucoup la France",                      " \* I love very much France ".*

It would also appear that children learning a language acquire its structures in a similar sequence. Different explanations of developmental sequences have been put forward. According to Felix (1984), the principles of Universal Grammar are themselves subject to an innately specified developmental process and lie latent until the moment of activation arrives. The child would then go through a restructuring of his/her existing grammar, adding a new principle to accommodate that violated in the existing grammar. Without postulating the existence of the LAD and the principles of UG, children would not get enough negative evidence to be able to test and reject incorrect hypotheses. The hypotheses formulated by the first language learners must therefore obey the constraints of Universal Grammar, as hypothesis testing becomes more feasible if the child's hypotheses are limited in number. The environment, in the form of the linguistic input, triggers these hypotheses. The theory claims that the environment provides enough positive evidence to

help the learner set the ways in which Universal Grammar is applied to the target language. The right environment at the right time triggers the acquisition process.

'Core' grammar is the set of elements that grow in the child through the interaction of the principles of Universal grammar and the relevant language environment.. However, "every language also contains elements that are not constrained by Universal grammar". These belong to the 'peripheral' grammar, and are usually derived from the history of a language, borrowings from other languages or purely accidental.

The notion of 'markedness' was first defined by the Prague school of linguistics as a phonological opposition, in which one of the members lacked a certain feature present in the other. The phoneme carrying the feature was said to be 'marked' for that particular feature, and the other to be 'unmarked'. This notion of 'markedness' was then extended to inflectional morphology by Jakobson (1941), later used in Chomskyan phonology and applied to Universal Grammar.

In GB, the rules of 'core grammar', are thought to be unmarked, whereas those of the 'peripheral' grammar are considered marked. Core grammar follows the principles of Universal Grammar, whereas peripheral grammar results from historical changes in a particular language. This leads to possible predictions about learnability, the rules of core grammar needing only minimal exposure, whereas the rules of peripheral grammar, which are marked, have to be learned on the basis of positive evidence of their existence in the grammar. In the absence of evidence to the contrary, unmarked options are selected. (McLaughlin,1978:97).

Chomskyists therefore argue that the ability to acquire a language is genetically determined, that children are endowed with a set of universal principles of UG, which

constrains the hypotheses they make, triggered by the appropriate linguistic environment. During the process of acquisition, parameters are then set specifically for a particular language. This theory claims to lead to predictions of learnability in first and second language acquisition. However more experimental and descriptive research is necessary - a proper criterion for markedness has to be established, and rules classified into core and peripheral grammar- so that Universal Grammar theory and its complement, the markedness theory can be of more use to SLA theory and research.

However, UG theory and GB are more concerned with the formal properties of grammar, and overlook the problems involved in the investigation of meaning and causation of behaviour. Linguistic theory deals with the content of the learning, i.e. the language and its structure, but does not delve into the actual process of learning.

According to Els (1984:31), "any theory of language learning will have to bridge the gap between the 'what' and 'how' of language learning", the 'what' referring to the linguistic content, i.e. the language itself, with its structure and meaning and the 'how' to the cognitive processes involved in the internalisation of that linguistic knowledge. Both internal and external factors seem to play a role in the development of language. (Blumenthal,1970:87). This led to the emergence of the procedural approach to language learning, which, while still maintaining a mentalistic outlook, shifted the focus of interest towards the children's cognitive ability to discover structure in the language around them and put these discoveries to use.

### **1.1.3. Cognitive theories.**

Cognitive and procedural theories (Anderson, 1983; McLaughlin, 1987) emerged as an attempt to fill the gap between the linguistic content and the cognitive processes deemed necessary to learn its structure. If we consider children's ability to discover structure in the language around them, they use a constantly expanding and changing system of discovery procedures in their comprehension and production of language. Learning is then seen as the acquisition of a complex skill, which can in turn be broken down into component sub-skills. The cognitive process of language acquisition deals with the internal representations based on the language system and the procedures to select appropriate vocabulary, grammatical rules, and pragmatic conventions. These internal representations are then simplified, unified in a constant process of restructuring. (McLaughlin, 1987: 133-134). Then they become automatized. These processes of 'automaticity' and 'restructuring' are outlined below.

Children exhibit language behaviour and, to explain the learning process, we need to know about not only the nature and structure of the input but also the functioning of the child's cognitive organiser, which processes this linguistic input. Cognitive theories adopt a procedural approach to language learning and view the production of language as a series of subgoals involving different skills. Speech production, for example, requires many skills ranging from lexical retrieval, to the activation of articulatory patterns and the choice and use of appropriate syntactic rules. Each of these component skills needs to be executed before the next goal can be tackled, though some goals may be achieved in parallel.

Some skills require more attention than others. The skills involved in processing linguistic information have to become automatic through practice. Learning a language can be equated with the development and building up of a set of procedures, which are initially

under conscious control, and must eventually become automatic, to free the controlled processes for dealing with more complex, or newer tasks.

Human learners are limited in their ability to process linguistic information and automaticity provides an explanation for the improvement in the performance of the learners. As component sub-tasks become more automatized, attention is then freer to move on to and tackle more complex tasks. The practice of subtasks through initial controlled processing leads to automatized routines. However the process of learning is far more complex as the new information needs to be organised and structured. Internal cognitive representations are changed and restructured in the process of learning.

A detailed treatment of the restructuring process has been provided by Karmiloff-Smith (1986). According to her, both adults and children use the same phases in problem solving, the first phase being data-driven and involving the mastery of the components of the task, the second directed at organising the data newly acquired, through simplification, unification and final control of the internal representation. Phase three integrates the two processes involved in phases 1 and 2. However, Karmiloff-Smith (id) also stresses that learning goes beyond automaticity, as it involves a constant modification of organisational structures. A similar approach taken by Rumelhart and Norman (1978) who identified restructuring as a process in which new structures have to be created because of conflicting data or new data and a new organisation has to be imposed on the rules and structures already stored. New structures can also be added to allow for new interpretation of facts.

However, their views differ slightly. For Karmiloff-Smith, automaticity and restructuring are two phases in a single process, whereas, for Rumelhart and Norman, they are different kinds of learning. For them some learning occurs by accretion, incrementation of data by a

new piece of data or set of facts, and restructuring is a discontinuous process which would account for language learners' sudden 'clicks' of comprehension.

The linguistic input available to the child is not only completely unstructured, but also similar to that available to the adult. It contains speech errors such as ungrammatical utterances, false starts, slips of the tongue etc. However these assumptions have been contested, first of all by Brown (1964), who observed that, when speaking to young children, parents often used short, syntactically well-formed semantically simple and repetitive utterances and subsequently by De Villiers and De Villiers (1978), who listed and summarised the known differences between adult-child and adult to adult speech.

In the phonological range of differences, they found examples of higher pitch, exaggerated intonation, clearer enunciation, slower speech, distinct pauses between utterances, phonological simplifications, distinct consonant-vowel combinations and frequent syllable reduplication.

The range of syntactic differences was even richer and more varied and included, amongst others, shorter and less varied utterance length, a higher proportion of well-formed and intelligible sentences, partial as well as complete repetitions of both parents' and child's utterances, with frequent expansion, fewer disfluencies or broken sentences, many constituents uttered in isolation, transformationally less complex input, fewer verbs, coordinate and subordinate clauses and embeddings, rarity of modifiers and pronouns, more content words and functors, frequent deletion of nouns, pronouns, and auxiliary in question words, more imperatives and questions, and an increasing number of declaratives increasing with the age of the child.

Semantic differences were also observed: i.e. a more limited vocabulary, unique words for objects and many diminutives, reference to the 'here and now', use of concrete referents, few references to the past, different generality in naming objects, and a more limited range of semantic relations. Pragmatically, adults also used more directives, imperatives, questions and deictic utterances when talking to young children.

This would seem to show that the adult-child speech is much more structured or 'adapted' than was commonly assumed. Do these differences obtain across languages and cultures? It might be argued that young children are exposed originally to simplified input, i.e. 'motherese', the simplified language used by mothers when they speak to their children. But the use of motherese is by no means universal as: "in many societies, parents and other caretakers do not use simpler codes in talking to young children. Simplification is viewed as an inappropriate speech behaviour. There is now considerable evidence that many children in the world learn their first language in a way that is different from the way that American middle class white children learn to speak." (McLaughlin,1987:4).

Even if they are provided with a simplified input, two questions are still left begging (Clark and Clark,1977:329-330): are these modifications necessary for learning and if not necessary, are they at least helpful? These questions remain unanswered (Els, 1984:33).

How, then, do cognitive theories explain the differences between children's input and output? No detailed models for the description of children's cognitive organisation of language are as yet available. Slobin (1973) postulated a number of operating principles, dealing with 'semantic coherence' (A, B, C), i.e. the mapping of ideas onto language and, 'Surface structure' (D, E, F), i.e. the segmentation of surface utterances, later re-ordered by Clark and Clark (1977:339-42) and listed as:

A) looking for systematic modifications in the forms of words,



- B) looking for grammatical markers that indicate underlying semantic distinctions clearly and make semantic sense
- C) avoiding exceptions.
- D) paying attention to the end of words,
- E) paying attention to the order of words, prefixes, and suffixes
- F) avoiding interruption or rearrangement of linguistic units.

Els et al (1984) express the opinion that these principles should be elaborated and refined for both first and second language acquisition from a cross linguistic perspective, to help us gain a better grasp of what is difficult and easy for language learners. This is also echoed by Bates and MacWhinney (1989).

Overall, in evaluating cognitive theories, we can see that several researchers argue for the existence of acquisition sequences in first language learning. The only way to accommodate the incorporation of 'natural' acquisitional sequences within the cognitive framework, is to assume that acquisition involves the development of routines in predictable sequences already automatized when they emerge. Sajavaara (1978) assumed two routes to acquisition, the former obeying linguistic constraints and therefore pre-determined and automatic and following 'natural' acquisitional sequences, and the latter a non deterministic route requiring automatization through controlled processes.

However the cognitive theory still cannot explain the linguistic constraints implied by the markedness theory or resulting from linguistic universals. Language learning not only involves the acquisition of a complex cognitive skill but also of a complex linguistic skill. It is only one way of looking at language learning. It can become more powerful if it is used in conjunction with linguistic research. (McLaughlin,1987:150). A better

understanding of the process of restructuring could be obtained through the analysis of linguistic data.

Furthermore, according to McLaughlin (1987:151), cognitive theory does not have the degree of precision required to enable us to make predictions about language learning. The range of phenomena it accommodates is also restricted and does not have the same explanatory power as markedness or Universal Grammar theory, which deal with a broader range of issues. Many of the key statements are rather imprecise and the basic concepts are loose in their definitions, including the critical concepts of 'capacity limitations', 'skill', and its 'components'.

McLaughlin (1987:152) further argues that language learning may not be a skill that involves the "accumulation of automatic processing through initial controlled operations that require more workload and attention", as the psychologists would have it. If we take the view that one of the routes to acquisition does not involve the gradual accumulation of skills through practice, but is highly determined by linguistic constraints already automatized on their appearance, the cognitive theory becomes both unfalsifiable and untestable.

McLaughlin (1987) also mentions that the process of restructuring allows for the possibility of discontinuities in the learning process and for exceptions in the notion that practice leads to improvement in the performance of learners. The effects of practice can then be taken to accumulate as learners develop more efficient procedures, their performance following a U-shaped curve, "declining as more complex representations replace less complex ones and increasing again as skill becomes expertise" (McLaughlin,1987). However, there is no precision about the timing and description of such a process of restructuring.

However, cognitive theory has an advantage over more subjective accounts of the learning process in that it enables us to assess the contribution of controlled and automatic processing, by allowing us to measure reaction times to determine under which conditions shifts in speed and attention occur. Conditions for the breakdown of automaticity in language processing can also be investigated as in Bock (1982). Further, evidence for some sort of automatic processing is provided by the studies on semantic facilitation effects of Favreau (1981) and on Stroop effects of Preston and Lambert (1969).

As its domain is different from but complementary to that of linguistic research, there is no doubt that cognitive theory might bring interesting insights into the processes involved in language learning, as definitions and concepts are refined and advantage is taken of empirical procedures and it should therefore not be ignored or overlooked.

#### **1.1.4. The Competition model:**

According to Bates & MacWhinney (1989) the parameter setting theory of UG, is interesting as a useful way to develop a linguistic theory. Though MacWhinney (id:34-35) agrees that such a theory "would greatly simplify the child's learning problem", he rejects the theory because of its lack of emphasis of the child's linguistic performance and its inability to explain some empirical data (id: 35-36).

MacWhinney prefers to construct his own model, the 'Competition' model, which does not have to rely on the existence of an innate language specific acquisition device (LAD). The competition model (MacWhinney,1987;Bates & MacWhinney,1989) is related to the behaviourist tradition, which claims that language learning comes from outside, from input from others and interaction and correction, rather than from inside the mind.

Therefore, "language is seen in terms of dynamic processing and of communication rather than as static knowledge" (Cook,1991:120). Communication is the key to language.

Language has 4 main aspects, word order, vocabulary, morphology and intonation. However, as the amount of space in the mind for using language is limited, the different aspects of language compete with each other for the same space. No language can pay equal attention to all these aspects, as this would take too much of the speaker's processing space. This would explain why different languages place different emphasis on different aspects: Chinese has complicated intonation and no space for morphology; English has a complicated word order and puts little emphasis on morphology; Latin has a complicated case system for nouns and makes little use of word order; French places greater emphasis on morphology.

In first language learning, children would therefore be discovering which cues are important for their native language and pay less attention to the others. Each of these aspects is then given an appropriate weighting, to indicate the importance of these cues. Acquisition of the first language is cue-driven learning and becomes "a pattern of detection that may or may not require the application of innate linguistic knowledge" (MacWhinney,1987:26), as more general principles of pattern detection and distributional learning would be sufficient for the task, with the child concentrating on the most salient features at first and ignoring the less important ones. This pattern detection process is greatly enhanced when meaning is available, as it provides both information and motivation. The order of acquisition of the relevant grammatical devices is determined by cue-validity, a function of the overall validity of that particular cue and of its reliability. Finally, children would go through a process of fine-tuning, in which the weightings for these cues would be re-adjusted, as and when conflict between these cues arise.

An Italian child acquires most aspects of gender, number and person by 2-3 years of age and can provide agreement on all the appropriate nouns, pronouns, adjectives and verbs, and therefore must control very early such abstract notions as those of noun phrase and verb phrase in his/her agreement system. (Bates & MacWhinney, 1989). In French, children as young as 5 or 6 can correctly determine the gender of words and agree adjectives with these nouns (Karmiloff-Smith, 1986), their attention possibly being drawn to regularities of gender and other agreement phenomena because of their interest in the words encoding these regularities. In English, a language in which decisions are based on word order, word order is acquired before grammatical morphology (Pinker, 1984), and gender is acquired late as it is not a very strong cue. As these features are more salient, the child would first concentrate on them.

The native speaker's knowledge in the later developments of the model is assimilated to a network of weighted connections, consisting of many simple on/off units massively interconnected. The model for the human brain is a neural net (MacWhinney, 1989), which mimics the operations of cognitive models, working on operating principles, not unlike those of Slobin (1973), already detailed in 1.1.3.

The competition model is relatively recent in its conception, addresses some of the performance processes needed in the comprehension and production of speech but needs further development and empirical testing. The same criticisms can be levelled at this model as at the behaviourist/associationist theories, as the mentalists argue that general principles of pattern detection and distributional learning are insufficient to account for the process of language acquisition (Carroll, 1989), as they ignore the nature of the knowledge that makes up the competence of the native speaker and the constraints operating on the structure of language.

### **1.1.5. Claims and hypotheses for first language acquisition.**

From this survey of first language acquisition theories, we have established that language may not be acquired simply through the process of imitation of sentences or adult utterances, as parents do not systematically correct their children for grammatical correctness but seem to be more concerned with communicating and interpreting their progeny's noises as sympathetically as possible. Some parents alter and restructure their utterances to small children, but there is no conclusive evidence that this occurs in all classes and all cultures or that it really facilitates the acquisition process. More evidence and experimental studies would have to be obtained across cultures and classes.

Nevertheless, children manage to learn their first language, instruction or no instruction, restructured input or not, and to find their own path towards the acquisition of their first language. They produce rule-governed utterances, different from the adult input, acquire the function words and morphological endings last, though these structures are the most frequent in adult speech, and every language appears to have a definite acquisition sequence.

The study of the linguistic structure is a prerequisite to any theory of language acquisition. However, we may also benefit in the future from the findings of cognitive theories, once they have refined, clarified and tested their basic concepts, and delved further into the processes involved in the production and comprehension of language.

The various models of first language acquisition, the UG model, the cognitive and competition models, have all been found wanting and incomplete, therefore making it difficult for us to adopt any definite model for our future investigations. We were particularly interested in the framework of the parameter-setting theory and markedness

theory and the study of the restructuring principles involved. Another alternative would be to use the competition model, which sees language acquisition as cue-driven learning, with languages varying as to the importance or weighting given to different cues.

A UG model would not be incompatible with but complementary to Cognitive theory or other processing models such as the competition model. "Each of them is at best a piece of the jigsaw" (Cook,1991:131). In the next section, we shall look at second language acquisition to try and reconstruct the puzzle and provide some answers to our research questions.

## **1.2. Second Language Acquisition:**

This section deals with second language acquisition, i.e. the learning of a second language in naturalistic conditions, in informal environments, in which unconscious processes are generally involved. Second language acquisition (SLA) is "not a uniform and predictable phenomenon, ..but the product of many factors pertaining to the learner and the learning situation" (Ellis ,1985:4).

First , we shall investigate the extent to which second and first language acquisition are comparable, whether they involve different or similar processes. Most language acquisition studies attempt to deal with the development of competence, but, as the rules the learner has internalised are not open to inspection, it has been necessary to concentrate on the performance of the learner, mainly in production. Competence involves the mental representation of the linguistic rules, whereas performance, refers to the comprehension and production of language. According to Ellis (1985:6), "Utterances are windows through which the internalised rule system can be viewed".

We will also look at some of the research methods used to investigate and analyse this learner internal rule system, with a view to identify appropriate research techniques in our own investigation. We shall particularly concentrate on assessing and evaluating the benefits of Contrastive Analysis (CA), Error Analysis (EA) and Performance Analysis (PA).

### **1.2.1. Are first and second language acquisition comparable?**

Comparability between first and second language can be considered in terms of the conditions for learning the two languages and the potential differences in the learning processes involved.

The concern of many first language acquisition theories was to build a grammatical model of a language so that it could be learned by all children, given the limited input and time available to them. This acquisition was usually achieved in stress-free, informal conditions, with plenty of individual attention paid to the communicative needs of the child.

Second language teaching, except in exceptional circumstances, cannot hope to provide the learners with an environment and the degree of immersion identical to that of first language acquisition, in which the children are often given individual attention and immersed in a particular language community.

Second language learners cannot usually afford to spend as much time as first language learners, immersed in a target language environment, unless the circumstances are exceptional. Second language acquisition occurs more rapidly. The Army Language School in California reckoned that 1300 hours of instruction were sufficient to achieve



near native fluency in Vietnamese. Foreign language teaching in Great Britain is given approximately 120 hours a year even in the compulsory National Curriculum.

If an adult or child were to achieve near native fluency by just applying the same strategies as first language learners, it would therefore be a miracle for any individual to get anywhere near basic native fluency, especially in such a short time. McLaughlin (1987) argues that adult or older children "have cognitive skills that enable them to take advantage of formal instruction". It would then seem reasonable to assume that formal instruction may accelerate the acquisition of a second or subsequent languages.

However, second language learners may be handicapped by their knowledge of a first language, when learning a second. One of the challenges of second language acquisition is "understanding how a second language is acquired, how the language acquisition skills interact with other cognitive skills in a unique situation where the learner already has the advantage (or disadvantage) of a relative degree of conceptual maturity, and a fully implemented ..... grammar of his/her first language". (Sharwood-Smith, 1985).

Brown's first language acquisition study had also revealed a consistent acquisition order in L1 learners, explained on the basis of internal cognitive mechanisms, and his results were confirmed by the replicative cross-sectional study of De Villiers and De Villiers (1978). L2 researchers therefore wanted to test whether the same acquisition order would obtain in second language learning, and if different, to investigate the influence of L1 on L2 orders, hoping that insight into L2 orders would be invaluable in the devising of teaching programmes.

A few L2 order studies ensued, generally aimed at the development of grammatical morphemes or functors, of function words, and morphological endings i.e. noun and verb

inflections, mostly based on the registration of oral-productive skills. They showed a considerable amount of variation with respect to number, L1 background, age of informants, type and amount of special instruction and the number of morphological factors involved.

- The Heidelberg project focused on the development of specific categories and word characteristics of these adult immigrant workers and explored the order of acquisition of 101 context-free rules of German, in order to determine and test the successive stages in which each of these rules are acquired.

- Cancino's study (1974,1978) also revealed four stages in the acquisition process and explained the results obtained by the phenomena of 'interference' of the native Spanish of the subjects.

- Dulay and Burt (1974a) began a long series of morpheme studies investigating the order of accuracy for 11 functors, in terms of the absence, misformation and presence of the correct functor and observed a high degree of similarity in the command of these functors. They concluded that their findings supported the hypothesis that, in an L2 learning environment, the order of acquisition of L2 structures was more dependent on the structure of the target language than on that of the source language .

Dulay and Burt (1980) argued that the difference in the orders found could be explained and reduced to the variability in type of the linguistic task, to the insufficiency of the data for all the subjects studied (more structures would be needed), to the level of proficiency of subjects and to the closeness of the rank order scores, which did not allow ordering.

Second language acquisition orders have been confirmed by a whole series of other morpheme studies, such as Krashen (1981) who found uniformity in all studies in which

language was used for communicative purposes and not for other linguistic tasks. The orders observed in most morpheme studies turn out to be invariant to a high degree and independent of the nature of the data collected and of learner characteristics.

Researchers have also attempted to provide an explanation for the existence of acquisition orders: Larsen-Freeman (1976) suggested explanations in terms of formal complexity, perceptual saliency or input frequency. However, the notion of formal complexity is difficult to define and requires the introduction of an independent criterion. Perceptual saliency causes other problems as non syllabic plurals are acquired earlier than syllabic plurals. As far as the input frequency explanation is concerned, Larson-Freeman (1976) found a certain similarity between the acquisition orders of L2 learners and Brown's parental L1 order of frequency.

Els (1984:88) remarked that unfortunately, the list of orders covered only a limited number of structures, that the effort put into such studies was disproportionate to the results obtained, and that nearly all energy has been spent in studying English as a target language. Furthermore, Els also argued that proposals for such explanations are unsatisfactory as there is often a lack of consistency in the categorisations. Furthermore, morpheme studies generally have a bias towards the final result rather than the developmental process. As more research would be needed to formalise these acquisition orders for every language studied, we get very little help from the morpheme studies to construct a teaching program reflecting these acquisition orders.

Not only are the conditions for learning different for first and second language acquisition, as the learner has less time to learn a second or other language, the input to which the learner is exposed is often very different and often more highly structured, especially in formal settings, with teachers controlling the input. Moreover, there is the additional

problem that the first language may actually interfere and that the learner may transfer some of the principles of the first language to the second. There appears to be similar order of acquisition for both FLA and SLA, but these would only obtain in naturalistic conditions. It will therefore be useful to see what the UG, cognitive theories and competition model as well as others can reveal about the second language learning process, particularly whether some of the processes involved are similar to those of first language acquisition.

### **1.2.2. Theories for second language acquisition:**

Several theories explored for first language acquisition have also been influential in second language acquisition theory. Other theories have also emerged on the basis of some of the notions and positions explored in the previous section. We explore next the position of UG, the competition model and cognitive theories on SLA, as well as introduce new theories, more focused on SLA, the Interlanguage theory and the Natural Approach.

#### **a) Universal Grammar and second language acquisition:**

The GB model, often considered as the most powerful account of L2 learning (Bell,1981:120), has had very little to say about second language learning in the classroom. Chomsky (1966) himself had doubts about whether his UG theory could be useful for language teachers, as he felt that psychology or linguistics had not yet achieved sufficient understanding to support 'a technology of language learning'.

In the last few years, greater interest has been taken into the possible applications of UG theory to second language acquisition, leading to a great controversy about access to the principles of Universal grammar in SLA. Most of the debates centre on whether the

'innate' principles of UG are still available to the second language learners or whether they use their L1 as a starting point to elaborate their L2 grammar.

We can recall that first language learners are equipped with an innate knowledge of UG, taking the form of "a set of substantive universal principles to which parameters - strictly defined possibilities of variation across languages- associated with a cluster of linguistic properties (Gass & Schachter,1989:70). "The values of these parameters were set by interaction with the input to which the learner is exposed". In second language acquisition, an important question for second language research is "whether the parameters that have been set for the first language need to be reset or readjusted for the second language." (McLaughlin, 1987:95).

What are then the possible scenarios for second language learners in the UG model?

- Is the full set of UG parameters still available to second language learners?
- Do L2 learners start from the L1 settings or from scratch?
- How can parameter mismatches between L1 and the target language influence its acquisition?
- Could there be an implicational hierarchy in the acquisition of the set of properties associated with that parameter?
- Are there learning principles not available to the second language learner?

Mostly, it would appear that L2 learners start from their L1 settings rather than from scratch and still have access to the principles of UG through their first language (Cook,1991:118). This scenario was confirmed by White (1989).

The concept of markedness has also been invoked to predict when transfer is likely to occur from the first language. (Kellerman, 1979, 1983). Structures that are perceived to be

more irregular, infrequent and semantically opaque are said to be more marked in the first language and were predicted to be less transferable than more regular and frequent forms. Unmarked forms are also thought to be less structurally complex than marked forms.

To adopt a UG framework, therefore, we would need an adequate formalisation of the parameter theory, combined with a theory of markedness for both the first and target languages. It is however doubtful that all the learning problems of second language learners can be dealt with within that model, as the research to-date is limited to specific areas (Pro-drop parameters, word order, etc) and often focused on English.

#### b) The 'Interlanguage' theory:

One other theory anchored on the principles of UG is Selinker's 'Interlanguage' theory, which has had a considerable impact on language pedagogy. The 'interlanguage' is a system of abstract linguistic rules underlying the learners' comprehension and production. Learners construct a series of intermediate tentative systems, constantly adapted and revised on the basis of the L2 input, until the L2 rules are acquired. This grammar is by nature changeable and unstable.

There are two possible starting points : either the learners have access to the LAD and L2 learning , like L1 learning involves the discovery of how the general principles of UG are realised in the target language (Cook, 1985) or they do not necessarily use the same LAD as the child and the similarity between L1 and L2 acquisition simply lies in the processes of hypothesis testing and formation.

As pointed out by Corder (1971), both first and second language learners have the cognitive capacity to make hypotheses about language and similar strategies and

procedures can be used. He further maintains that errors are necessary and systematic stages in the language learning process.

This 'interlanguage' development reflects the operation of both cognitive learning strategies, transfer, overgeneralisation and simplification (Cancino et al,1974) and communication strategies, paraphrase, code switching, which help the learners to compensate for their lack of knowledge when the necessary linguistic resources are unavailable to them (Tarone et al,1976).

Central to the possible explanation of errors is the notion of 'interference', which considers the factors impeding or facilitating the learning of new skills and the role played by already existing skills. The second language learner has already developed a set of learning skills in the acquisition of his/her first language. Two types of transfer are involved in the acquisition of new skills, i.e., pro-active transfer, which deals with the transfer of existing skills onto new skills, and retroactive transfer which transfers new skills onto existing skills. Transfer can be positive or negative. Similarities between two skills can have a facilitating or positive influence on the command of the skill to be acquired. Negative transfer or 'interference' is the transfer of a skill that impedes or has a negative influence on the acquisition of a new skill.

Learning problems can be classified as interlingual or intralingual. The interlingual problem is caused by interference from the first language. Intralingual problems are system internal problems which cannot be traced to differences between the two languages and cannot be predicted by a Contrastive analysis, e.g. overgeneralisations such as 'goed', 'seed', which can be found both in the speech of L1 and L2 learners.

Interference is more likely to occur, according to James (1980:146) when one of the factors influencing the probability of occurrence is present, i.e.:

- (a) when the L2 input is limited in quantity and scope, i.e. in schools;
- (b) in morphology and syntax;
- (c) when the degree of translatability of L1 features into L2 features is high;
- (d) in the first stages of the learning process;
- (e) if the focus is on the correctness of grammatical forms rather than on communicative effectiveness.

The learners' interlanguage systems also fossilize (Ellis,1990:52). The learners stop developing their interlanguage grammar in the direction of the L2 either because their communication needs are sufficiently realised and impede further development or because full linguistic competence in the L2 is neurolinguistically impossible for most learners (Selinker and Lamendella,1978). Many of the questions raised by the interlanguage theory have not been satisfactorily settled. This theory also provides an interesting framework in which to study the learners' interlanguage systems.

#### c) The Competition model:

In the competition model, in which the task for first language learners was to discover which of the four clues ( word order, agreement, case and animacy) had greater weighting, learning a second language would mean re adjusting the weightings for each of these cues. Initially, L2 learners would transfer the weightings of their L1 to the new language. This would predict learning problems for English native speakers, with a great emphasis on word order and semantic clues when learning a highly inflected language relying primarily on morphological clues.



d) Cognitive theories and learner strategies:

We recall that cognitive theories adopted a procedural approach. The L2 learner has two types of L2 knowledge, declarative and procedural (Faerch & Kasper, 1983). Declarative knowledge, or 'knowing 'what' ', consists of internalized L2 rules and memorised chunks of language whereas procedural knowledge or 'knowing 'how' ', consists of the strategies and procedures employed by the learner to process L2 data for acquisition and use. (Ellis, 1985:164).

Procedural knowledge has a social and cognitive component, the former consisting of the behavioural strategies used by the learner, and the latter the various mental processes involved in internalising and automatizing new L2 knowledge, and in using that knowledge in conjunction with other knowledge sources to communicate in L2. These processes involve both learning and using the L2. Learning processes account for how the learner accumulates new L2 rules and automatizes existing ones, by attending to input and by simplifying through the use of existing knowledge, and for the natural sequence of acquisition. Learning strategies again include memorization, overgeneralization, inferencing, and prefabricated patterns. The learning process involves constant hypothesis testing from the learner.

According to Ellis (1985) there are two types of linguistic product, formulaic and creative speech. Formulaic speech consists of expressions learned as unanalysable wholes and employed on particular occasions (Lyons, 1968:177). Routines refer to whole utterances learnt as memorised chunks and patterns to utterances that are only partially unanalysed and have one or more open slots (Krashen and Scarcella, 1978).

Formulaic speech is very common in the early stages of SLA. Each formula is tied to a particular communicative goal. Formulaic speech occurs when the learner is forced to speak before he/she is ready (Krashen,1982). The learning strategies involved in acquiring formulaic speech could include pattern memorization, pattern imitation, common to audiolingual techniques. Formulaic speech serves as the basis for creative speech, once the learner realises that the chunks consist of discrete elements which can be combined with other constituents in a variety of rule-bound ways. Fillmore (1976) suggests that, in SLA, formulas are submitted to a process of analysis that releases elements for use in slots other than those they initially occupied. The basis of this analysis involves the learner comparing utterances in order to identify which parts recur and which parts remain the same, then gradually noticing variation in the formulaic structures according to the situation and detecting similarities in the parts of different formulas (Fillmore,1979). To account for this process, a strategy of pattern analysis can be posited. Formulaic speech is probably only a major factor in early SLA. Pattern memorization and pattern analysis are to be seen as minor learning strategies in comparison with those contributing directly to the creative rule system.

Creative speech, on the other hand, is the product of L2 rules, which allow the learner to produce entirely novel sentences, in the Chomskyan sense. These rules constitute the learner's 'interlanguage' system and account for the 'natural' sequence of development. (Ellis, 1985:170). They are to be distinguished between those involved in establishing interlanguage rules and the strategies involved in automatizing 'interlanguage' knowledge. For the former, Ellis distinguishes two basic and related processes, hypothesis formation and hypothesis testing.

According to Faerch and Kasper (1983), hypotheses about the interlanguage can be formed in 3 ways, by using prior linguistic knowledge, by inducing new rules from the input data or a combination of those. There are also two more general strategies at play, simplification and inferencing. "Simplification consists of attempts by the learner to control the range of hypotheses he/she attempts to build at any stage in his or her development by restricting hypothesis formation to those which are relatively easy to form and will facilitate communication." (Ellis 1985:171). It is evident in the use of a number of strategies. Transfer involves using the learner's L1 as a basis for forming the hypotheses about the L2, while over generalisation involves the use of existing L2 knowledge by extending it to new interlanguage forms. Both are manifestations of using prior knowledge to facilitate new learning. (Mc Laughlin,1978). Simplification plays a positive role in learning, in that it limits the number of hypotheses formed by attending to input (through inferencing) at any one time.

Inferencing is the means by which the learner forms hypotheses by attending to input, by inducing the rule from the input. Carton (1971) distinguishes inferencing in terms of three types of cues, intralingual cues, derived from the morphological and syntactic regularity of the L2, interlingual cues, derived from loans between languages where similar forms are hypothesized, and extralingual or contextual clues. Intralingual inferencing is the result of 'intake' analysis, intake being the language that the learner can decode and analyse. The use of this strategy may be governed by innate linguistic or cognitive predispositions to attend to specific features of the input, which could involve either the 'universal grammar' of Chomsky or the use of general perceptual strategies, as listed in Slobin's operating principles.

d) The competence/control model:

According to Bialystok and Sharwood-Smith (1985), there are two facets to L2 learning, the knowledge that makes up competence and the control involved in the production of speech. The interlanguage of the learners progresses because of the improvement in either the learners' underlying knowledge of the language, or of their processes. Control is also an important factor in language variation (Tarone, 1988), as the learners' language varies according to situations : mastery of newly learnt items in a formal environment, in which they pay more attention to their speech, precedes use in informal situations.

As consciousness is excluded from both UG and competition model, this is an interesting position, which raises questions about whether awareness of the actual rules is a help or a hindrance to the acquisition process and whether learners should be made conscious of the rules of the target language (Cook, 1991:125). A different viewpoint is taken by Krashen, in his 'Natural' approach.

e) The Natural approach: .

The Natural Approach: was devised as an attempt to incorporate the 'naturalistic' principles researchers had identified in studies of Second Language acquisition to the teaching of languages. The term 'natural' merely emphasized the belief that the principles underlying the method were to conform to the principles of language learning in young children. This approach is based on five hypotheses concerning:

- (i) the differences between 'acquisition' and 'learning': competence in a foreign language can develop in two distinct ways, the natural way, 'acquisition', which parallels first language development, and refers to an unconscious process that involves the naturalistic development of language proficiency through

understanding and using language for meaningful communication and 'learning', which refers to a conscious process by which the explicit knowledge of the rules is developed.

(ii) a 'natural' order for 'acquisition', which is predictable and similar to that of L1 acquisition, which emerges when the focus of the learning is on communication. This natural order, according to Krashen, does not manifest itself in form focused activities.

(iii) the role the 'Monitor' has to play in 'learning': formal teaching is necessary for learning to occur and error correction helps with the development of the rules. However, learning cannot lead to acquisition. Conscious learning can function only as a 'Monitor' or editor that checks and repairs the output of the acquired system. The successful use of the Monitor is limited by time, focus on form and knowledge of the rules.

(iv) exposure to comprehensible 'input': as in first language acquisition, where children are provided with samples of 'caretaker speech', adults and second language learners are provided with simple codes that facilitate second language comprehension, 'foreigner talk', or 'teacher talk' in the classroom, characterised by a slower rate of speech, repetition, restating, use of yes/no instead of 'wh' questions. Language teaching must provide as much comprehensible input as possible, defined as input that contains grammatical features just a little beyond the current level of the learners. Whatever helps comprehension is important and work should centre on meaningful communication rather than on form.

(v) the 'affective filter': 'acquisition' also depends on attitudinal variables, subsumed under the notion of 'affective filter': the learner's emotional states or attitudes can facilitate or block 'acquisition', with a low affective filter more

desirable. This filter is related to motivation, self-confidence and anxiety. Though these factors are no doubt very important to the learning situation, we will not expand on these, as we are concentrating on the role of linguistic structure and syntax in second language acquisition.

If language learning necessarily occurs in the right conditions and with the right comprehensible 'input', these will have to be specified more precisely to make this approach successful. More research also appears to be needed into acquisition sequences, learning processes and learner's needs.

#### f) Implications of the theoretical issues for language teaching:

Thus, second language acquisition is likely to be different from first language acquisition, because of the differences in contextual conditions, the previous knowledge of another language, the learner's native language, which can interfere with the learning of another. However, second language learners, bilinguals excepted, have a greater degree of maturity and might benefit from the strategies acquired in their first language to learn another.

Second and other languages are not often learnt as successfully and to the same degree of mastery as the first language, though they appear to be learnt in a similar order, at least in naturalistic conditions, and involve some of the same processes, i.e. hypothesis formation, inferencing, over-generalisation as first language acquisition.

### **1.3. Research Methods in Second Language Acquisition.**

In this section, we investigate three different areas of research and their procedures, primarily with a view to critically evaluating and isolating the research methods we may

use in our subsequent investigations. We give an overview of three methods which have played a considerable role in SLA research and theory building (Selinker,1992):

- contrastive analysis (CA), which endeavours to compare the structure of the native and target languages and predict possible problems for the learner of the target language arising from the differences between the two languages;
- error analysis (EA), which studies the ways in which the production of the learner deviates from the target norm and attempts to describe, classify these errors and explain why they should occur often in such a systematic way;
- performance analysis (PA), the examination of the grammaticality judgments of second language learners.

### **1.3.1. Contrastive Analysis:**

Contrastive analysis is based on the differences and similarities existing between two or more languages. Are most of the difficulties facing the second language learner imposed by his/her first language, or does the degree of similarity between the first and the second language predict difficulty in learning? It is assumed that the comparison between two languages might lead to some insights about possible learning problems, even if it does not explain them all away. Some researchers also hoped to use these insights in the development and production of course materials.

CA essentially attempted to establish the universal and specific characteristics of languages. Initial research concentrated on phonological relations and on the evolution of the languages to be compared. But this task was so vast that it led the Prague school to introduce a synchronicity constraint on the comparison of languages of different types. However, even this constraint did not solve all the problems.

It was difficult to identify the features that could be compared between languages. Languages are not structurally isomorphic and there is often divergence or convergence between two languages, at the semantic or morphosyntactic level.

<i>e.g. French</i>	<i>/English :</i>
<i>il joue</i>	<i>he plays/he is playing. (convergence)</i>
<i>tu joues/ vous jouez</i>	<i>you play. (divergence).</i>

There may be many lexical gaps in one of the languages, e.g. where no language has a single word equivalent for a concept expressed in another language (e.g. 'mind' in English, French and German). The comparison of category or a class of categories presupposes the existence of a criterion of equivalence between two languages, which could be based on either structural or functional language features. The decision depends on the model of linguistic description used and the same model will have to be used for both languages.

The linguistic models used in CA were either traditional, structuralist or transformational generative grammars. Traditional grammars are often not explicit enough and the terminology is often difficult to understand. This led to the missing of important generalisations. The choice of the sentence as the highest level of speech performance, provoked the structuralists and their critics into a debate about the possibility or impossibility of isolating sentences.

Transformational generative grammar uses as data the intuitive judgments of learners about the grammaticality of sentences in a language. In this model, the criterion for comparability between two sentences is no longer the surface structure of the sentences but their deep structure, two sentences being identical when they consist of the same number of rewrite rules applied in the same order. (Corder,1971). However, some problems still remain: the notion of deep-structure has undergone so many changes that



the criterion of equivalence has had to be reformulated many times. Moreover, the status of intuitive judgments on equivalence is doubtful: there are two existing criteria, a formal derivational one and an intuitive translational one. Competent bilinguals (though this notion of competent bilingual is also controversial) appear to consider some structures mutual translations of each other when they are derivationally different.

Contrastive analysis also allows us to consider whether linguistic differences between languages create a learning problem. Is there interference between one language and another? According to Weinreich (1953), the greater the differences between two languages, the more numerous the mutually exclusive forms and patterns, the greater the learning problem and the potential area of interference. Languages were compared to predict the difficulties in learning and this led to a list of hypothetical problems until final validation of the hypotheses was achieved by checking it against the actual speech.

However Contrastive analysis predicted language problems that did not occur and did not predict actual learning problems. The following error does not occur in the spoken French of English native speakers.:

*Il est donnant moi la pomme. \**

Some bound morphemes, expressing tense, number and aspect would be treated as language specific by the L2 learner. This would tend to show that there is not a direct correlation between linguistic differences and learning problems in L2 (Kielhofer, 1975; Sharwood-Smith, 1979). Furthermore, linguistic difference did not always cause a learning problem.

Therefore it appears best to weaken the possible contribution of Contrastive analysis and consider the structural differences between two given languages to be one of the factors

that can create learning problems. It would then remain to establish the influence of other factors and find a theory which could adequately account for the known facts.

As far as language teaching is concerned, Fries (1945:9) maintained that "the most effective materials for L2 teaching are those based upon a scientific description of the language to be learned, carefully compared with a parallel description of the native language of the learner". However, as Els et al. (1984) remark, Contrastive analysis to be useful for classroom practice needs at least 3 major links, the analysis itself, its conversion into a form easily understandable by non-specialists and its final actualisation into teaching materials. No great success has been achieved in the conversion of contrastive analyses into teaching programmes and there has not been any systematic research evaluating teaching methods based on Contrastive analysis. Nowhere has it been demonstrated that materials based on CA have been more effective than others.

In summary, CA lost most of its original appeal and most researchers have either considered giving up the explanation and prediction of errors and the development of course materials in favour of using the analysis itself as a basis for translation theory, language typology and the study of linguistic universals or weakening the claim made by early contrastive analysis to the possible explanation and prediction of some L2 learning problems. However, it still provides a useful framework in which to generate and test some SLA hypotheses (Selinker,1992).

### **1.3.2. Error Analysis.**

Error analysis focuses on the second language learner and researches into the nature and causes of deviations from the second language norm. In second language learning as well as in first language learning, learners regularly produce forms and structures which can be

considered as deviations from the adult native norm. Norms are dependent on the medium, the social context and the relation between speaker and hearer. What seems acceptable in a particular context may become an error in another and an error in isolation may be otherwise acceptable in a particular context.

Initially, these were taken to be avoided as much as possible and their causes were often attributed to interference from the native language (see 1.2.2.). Pattern drills, elaborated as a direct application of behaviourist learning theory, were considered specially useful as a possible remedy. The concept of error has been rejected from most first language acquisition studies since the 1960's but is still prominent in second language research. According to Corder (1971), errors are necessary and systematic stages in the language learning process.

Error analysis usually includes a series of successive steps, identification of errors, description, explanation and evaluation of these errors and the prevention of errors. We have seen that it is difficult to predict and explain errors from a simple contrastive analysis and that Contrastive analysis left the learner out of consideration. According to Els (1984: 50), Contrastive analysis focuses on pro-active interference and on production rather than comprehension. Linguistic differences between two languages would be giving rise to a proportional amount of interference from the first language and the absence of these differences would facilitate the learning of the second language. Such claims are doubtful, as was already demonstrated in 1.3.1.

Some L2 learning problems also appeared to be the result of a lack of contrast between the two languages. (Els, 1984). L2 learners often avoid the constructions which are too similar to those in their first language, or too difficult to process and use. This is known as the avoidance phenomenon. Moreover Els also points out that interference often occurs

frequently between closely related languages. The amount of interference is often determined by the degree of translatability from one language to the other, as seen in 1.2.2.

These observations led to the need for distinguishing between interlingual and intralingual learning problems, concepts central to interlanguage theory, also explained in 1.2.2.. Another way of describing L2 errors has also been developed by Burt et al (1975) who collected 513 deviant utterances obtained via elicitation procedures, intended to elicit as natural a language as possible from a sample of 179 5-8 year old Spanish speaking learners of English. The errors encountered were classified into developmental errors, similar to the L1 learning errors, interference errors, those which reflected Spanish structure, and unique errors, all other errors ( Dulay and Burt, 1974b). Their data clearly showed the important role of intralingual deviations from the L2 norm. Both types of deviation also are indications of cognitive activities performed by the L2 learner, which may be explainable by the specific operating principles used by a L2 learner.

A study of auxiliary and verb phrases realisations in the translation into English of a set of 80 sentences, with 8 different sentence types, was also carried out by Taylor (1975) involving two groups of Spanish speakers learning English, ranked as elementary and intermediate. Taylor demonstrated that interlingual errors were more frequent with elementary learners but that both groups produced predominantly intralingual errors. These studies show that the role of interference in L2 learning is not as important as was initially assumed (Els, 1984:58).

Errors are also sometimes classified in terms of competence and performance errors, as first suggested by Corder (1971). Errors of competence are produced by the application of rules by the learner which do not correspond to the L2 norm. Performance errors are

mistakes of language use and include repeats, false starts and slips of the tongue, similar to those found in adult native speech. Performance errors occur both in L1 and L2 learning and can be corrected by the learners, once pointed out. Errors of competence cannot. To identify the errors of competence, knowledge about intended and actual utterances needs to be accessible. This can usually only be done by asking the learner about their intentions. If the learner is not present, intentions will have to be inferred.

Overall, we must conclude that there are limitations to Error analysis. As most error analyses result in the classification of deviations of the L2 norm, they all run into problems, concerning the definition of the notions of competence and performance and their subjectivity, the difficulties of ascertaining and classifying errors into intralingual and interlingual errors, and the failure of Error analysis to explain or describe certain phenomena of second language learning, such as 'avoidance'.

The distinction between errors of competence and errors of performance is not clear-cut. The learner must be available for questioning to enable the researcher to classify them. Moreover, he/she may be able to recognise and repair his/her errors but retain them in language use. A large number of errors may indicate lack of automaticity in the use of language skills and therefore lack of competence, and the interpretation of the errors which cannot be corrected may remain unclear (Els, 1984:61).

In addition, the operating principles used by the language learner are not always easy to determine. In many cases, it would be difficult to choose between an interlingual or intralingual principle. Both may even be at play. This leads to discrepancies between the criteria and results obtained in different types of error analysis. (Els, 1984:62-63). Els also points out that most discussions on Error analysis have the underlying assumption that

"difficulty of learning is indicated by a greater frequency of errors" and that errors and difficulty of learning are not always coincidental.

Moreover, some L2 problems cannot be captured in 'corpus based research', specially the problem of avoidance, which describes the under-representation of words or structures in L2 use. Avoidance can result from both the lack of differences between L1 and L2 or too great a difference. The avoidance principle operates most often in language-specific items, proverbs, idioms, slang expressions, etc and not in the case of language neutral items, internationalisms, borrowings, conceptual differences, count non count distinctions, writing and punctuation (Els, 1984:64-65).

Finally the most fundamental criticism levelled at Error analysis by Els is that it does not provide any insights into the L2 learning process. EA obscures our view of L2 learning behaviour, because it is restricted to what the learner cannot do, and gives only a static picture of L2 Learning behaviour. The limitations of Error analysis led to the greater popularity of Performance analysis.

### **1.3.3. Performance Analysis:**

Performance analysis focuses on learning behaviour as a whole, uses a procedural approach and attempts to evaluate what the learner can or cannot do at various stages of its second language development. It attempts to study the structural principles applied by the learner at each stage of the learning process. Much more research has been done in the syntactic and morphological development, an area on which we are also concentrating.

Performance analysis attempts to describe the successive stages in the L2 learner's development in terms of a series of transition grammars. One example of such an attempt is the interlanguage theory of Selinker ( 1972; 1992). The problems with this approach lie

in the description of these grammars and the attempts to formalise them. These grammars have both a diachronic and a synchronic dimension, they vary according to time and circumstance. Learners do not automatically make progress, there are also stages of levelling and sometimes regression to a previous developmental stage, a phenomenon often described as 'backsliding'.

L2 performance studies vary considerably in their design, especially in relation to the period of time over which data is collected, the sample of informants used, and the data collection procedures themselves. Performance studies can be either longitudinal or cross sectional, i.e. they can study the same group of individuals over time and draw conclusions about which aspects of L2 have been mastered, or give a picture of language development over time. Therefore they can be very difficult to compare or replicate.

A cross sectional study allows the researcher to make statements about the order of accuracy, and a longitudinal study allows them to make statements about the order of acquisition. Longitudinal studies have advantages over cross sectional studies but are very time consuming, as they invariably involve single or multiple case studies. The best way out is to combine both approaches into a 'quasi longitudinal design, in which cross sectional samples of language behaviour of different groups at different stages of development are collected and compared.

The variety of procedures for data collection, ranging from observation of natural behaviour to the most difficult experimental tasks also creates problems. Natural observations are a rich source of both expected and unexpected linguistic data and minimise the risk of interference from other skills in doing tests to linguistic skills. In experimental research, the data is easier to collect, order and interpret, there is no accidental or useless data.

We will discuss examples of the various research methods used in syntactic or morphosyntactic studies, showing a considerable amount of variation in terms of numbers, L1 background, age of informants, type and amount of special instruction and morphological factors involved.

- The first, the Heidelberg project focused on the syntactic development of specific categories and word characteristics of ESL learners in an L2 environment and was based on naturalistic data collection techniques, i.e. a series of interviews in the participants' homes, and observation and recording of their linguistic behaviour in two settings, in factories and at the aliens registration office. The results were measured against those of a control group of 12 Heidelberg dialect speakers. The data collected from 60 adult immigrant workers in the Heidelberg area (Klein and Dittmar, 1979) was based on the cross-sectional performance of a group of individuals at a particular moment in time..
- The second, the Cazden project, aimed at the observation and discussion of the acquisition of negative and interrogatives by 6 subjects (Cancino et al (1974, 1978) Schuman (1978), and used naturalistic data collection, with samples of spontaneous conversations about topics of mutual interest, elicited conversations (about games or pictures) and experimental elicitations (imitations of model utterances, transformation and permutation of sentences) and pre-planned socio linguistic interactions in the subject's own homes. The data was better presented, but limited and less sophisticated in its linguistic description.
- Other performance analyses also concerned the morphological development of L2 learners, based on Brown (1974) and De Villiers & De Villiers (1978) (Burt, 1974a; Rosansky, 1976), which originally studied the development of 14 grammatical morphemes



of English, using both naturalistic and experimental data collection procedures in cross-sectional studies.

We have already discussed some of the criticisms levelled by Els at such morpheme studies in 1.2.1., some of which related to the lack of consistency in research methodology, the lack of consistency in the categorisations and the unsatisfactory explanations. Further, he also argued that more attention had been paid to the degree of similarity between groups than to the degree of similarity between individuals and there was a general bias towards the final result rather than the developmental process (Els,1984:88).

Other areas seem to have been neglected in comparison. Lexical development only achieves a modest place within contrastive and error analyses. Phonological development has been paid more attention than lexical development and evidence of phonological interference has been discovered. Empirical studies for phonological development appear as rare as for lexical development and in the few that actually exist, it is suggested that the L2 learner uses mastery of L1 phonology as a basis for learning L2.

Performance studies provide a positive framework to study the performance of second language learners, by focusing on the positive aspects of linguistic competence, on what a learner can do at a particular stage in his/her linguistic development, on a longitudinal and cross-sectional basis. Particularly interesting is the idea of learners constructing a series of transitional grammars, or 'interlanguage' and language development can then be seen as the transition from one of these grammars to the other. These concepts of developing grammars might be extremely useful in helping us construct particular models of learners, by studying and comparing the developmental process of each of the second language

learners. Therefore performance studies appear to have a lot of potential as a second language research framework.

#### **1.4. Implications for Further Investigations and Research:**

We started with a set a research questions at the beginning of the chapter:

- a) Are language learning strategies and processes specific to language learning or just a special case in human development and maturation?
- b) What are the cognitive processes involved in language learning and are these processes the same for first language acquisition and second-language learning?
- c) Can first and second language acquisition be compared?
- d) Can the same conditions apply or are the situations and processes different?
- e ) What are the implications for second language teaching?

and arrived at the following provisional answers:

a) While the Behaviourists argue that language learning is just part of general behavioural development, the Chomskyists believe it is a special case, explicable only by recourse to a language specific cognitive structure, the Language Acquisition Device. Given the work yet to be done on criteria for markedness and classification of grammar rules into core and peripheral, GB theory cannot be fully predictive. The issue is not settled as behaviourists like MacWhinney still argue that it is not necessary to invoke the LAD to account for Language Acquisition.

b) As mentioned in the discussion of cognitive theory, the cognitive processes identified for FLA may involve automatization, restructuring and cognitive organisation, all of which are valuable concepts for thinking about SLA and could help us to direct empirical research design. Phonology and morphological developmental studies have also shown

that similar processes of hypothesis formation are involved in SLA, but that the learners do not start from a blank slate and may use the principles of their L1 as a starting point of the L2 acquisition process, whether we consider the UG framework, 'interlanguage theory' or the competition model.

c) Though SLA might involve similar processes as L1 acquisition, there was a considerable difference in the conditions of the learning, with less time available, more opportunities for structured learning and more likeliness for errors to be avoided or corrected. Moreover, the L2 learner was more mature and possibly a better learner, but did not necessarily have the same socially and culturally integrative motivation to learn to master another language. Furthermore, knowledge of a first language also interfered possibly with the acquisition of another, as previously learnt principles had to be abandoned, restructured and re-ordered ( i.e. the parameters in UG theory had to be reset and the weightings of the competition model restructured).

d) From this survey, the conclusions we can draw are, that SLL is not strictly comparable with FLA, although both FLA and SLA in natural settings appear to follow a similar invariant sequence. In naturalistic conditions, learners appear to follow the same path towards acquisition and use similar cognitive processes. However, the outcomes and processes are widely different., as L1 acquisition is automatic and unconscious, whereas L2 acquisition is often imperfect and incomplete and is more likely to involve conscious knowledge of the rules of grammar.

e) Our primary investigation has also revealed important issues for language teaching pedagogy.

If second languages are acquired in a similar order as first languages, then these need to be researched and formalised, to inspire the design of teaching programs for these structures. Formal instruction could take advantage of the maturity and the acquired implicit knowledge of the structures and learning processes involved in first language acquisition, once these have been established.

This also raises the question of whether formal instruction and in particular awareness of the rules of the target language can help the learners improve their performance and accuracy in that language.

Finally, we have also explored a variety of research methods, Contrastive Analysis, Error Analysis and Performance Analysis. These research frameworks can contribute perhaps to the enhancement of the breadth and depth of the explanation for the data collected (Selinker, 1992). However, none of these methods has given us sufficient insight into the origin of errors, as is needed for the generation of student models and clear directions for teaching strategies. The issues related to formal instruction and pedagogy will be investigated in Chapter 2.

## **2. SECOND LANGUAGE TEACHING AND CALL:**

In Chapter 1, we have investigated current theories of first and second language acquisition in search of a possible model to adopt for our later investigation, and some research questions and methods about language acquisition. We concentrated mainly on naturalistic acquisition, i.e. the learning of another language in a country where that language is spoken and used for communication. This chapter is concerned with instructed language acquisition, i.e. language learning in a more formal environment and the methods and techniques used by foreign language teachers and lecturers to facilitate the learning of another language.

It is to recapture the advantages of the natural setting that formal instructional methods have moved away from a focus on grammar to a more communicative approach. The learners just learn their new target language through interaction, games and meaningful tasks. The role of the teacher then becomes that of a manager of learning, that of making sure that the students are provided with ample opportunities for interaction, with each other and sympathetic native speakers, through exchange mail, tapes or trips abroad. What is important is to be able to communicate in a number of appropriate situations.

We shall investigate the current teaching styles and see how they attempt to teach languages, focusing on the teaching of syntax and the formal structures of the target language to be learnt, establishing when possible the links between the theories and the practice observed in the classroom. The benefits of these approaches and techniques will be evaluated in the light of the research findings in SLA and of the recommendations of the National Curriculum.

Language teaching has always attempted to make best use possible of the technology available. Computers are set to play an increasing role in the learning environment of language learners and we shall explore their potential and possible contribution to the enhancement of these learning environments. As we are interested in the teaching of grammar and rules, we shall look at the teaching strategies adopted in the design of CALL programs with a view to improve the efficiency of these programs.

From this survey of the fields of current teaching methods and techniques and their application to CALL, we shall then formulate criteria for appropriate design features for CALL programs and give a preliminary outline of the research question to be investigated.

### **2.1. Formal Language Instruction in the UK**

There appear to be many approaches and methods to second language teaching and the quest is still on for the best approach to adopt. Approaches differ in many respects, in the type of linguistic and learning theory on which they are based, in the choice of content to be taught and the focus to adopt in the teaching, the methods of instruction used and the procedures adopted to present and practice the content (Richards and Rodgers, 1985).

One of the most important differences concerns the way instructional materials will be used to teach a particular point. The same materials can be used differently if the focus of instruction is different. A priority has to be assigned to form and structure or to content and vocabulary. Structure is paramount in the Grammar Translation method, the Oral/Situational approach, the Audio-Lingual approach, and the Silent Way whereas in the reform movements, the Direct Method, in Communicative language teaching, the Total Physical Response and the Natural Approach, emphasis is placed on meaning and vocabulary. Even in those, structure is rarely ignored, as grammar is often taught through the practice of patterns arising in the topic.

The manner in which the structure of the language is to be organised, introduced, practised and learnt also varies between the different approaches. The oral/situational approach presented the sentence in its linguistic context with the help of objects, pictures, and realia, graded structures according to linguistic complexity and practised these structures with repetition, imitative drills and substitution tables, whereas the audio-lingual approach introduced them in a dialogue to be practised, imitated and drilled through repetitions, substitutions and pattern drills.

Another issue concerns the explicitness of the teaching of the rules. We have seen that first language learners generally acquire their first language without necessarily receiving any formal instruction and being made conscious of the rules operating in their first language. Some methods attempt to emulate these conditions and prefer not to have the learners analyse the chunks of target language presented to them and used by them and expect them to infer the rules of grammar from examples as in the Direct Method, the total Physical Response, the Silent Way and the Natural Approach. Others either think that analysis and explicit teaching of the rules of grammar facilitates learning and improves correctness e.g. the oral/situational approach, some versions of the communicative approach and the counselling-learning approach. In others still, rules of grammar are to be taught inductively, i.e. the learners are supposed to deduce the rules of the target language from a set of examples, practiced and possibly revised at a later stage. Pure deduction and analysis is only to be found in the early grammar translation approach, which lacked a well-founded theoretical basis (Richards & Rodgers, 1985).

There has been a shift in the focus of syllabi and teaching programmes in the last two centuries from an analytic grammar oriented approach, with explicit reference to grammar rules, to a more intuitive oral approach, concentrated on oral communication, using more inductive teaching of grammatical structures. This is now deplored by examination

syllabuses, higher education lecturers and the National Curriculum for modern foreign languages. Attempts are being made to redress the balance between communication and accuracy and we will indicate how this can possibly be done, taking into consideration trends in language teaching methodology and current educational principles.

The choices and developments of various language teaching approaches are prompted by a series of considerations and questions which may arise in the minds of the teachers and educators, wishing to devise and design the best teaching programme possible (Richards & Rodgers, 1985:12). These include various views on the primary goal of language teaching, the choice teaching objectives such as conversational proficiency, reading or translating, or some other skill, the basic nature of language and its possible implications for the teaching method. They may also identify principles of organisation, sequencing, and presentation aimed at facilitating learning, justifying these principles with their views on the role of the native language and the processes learners use in mastering a language, then incorporate them into a method, which influences the teaching techniques and activities according to the circumstances.

### **2.1.1. Language teaching methodology**

#### **Early language teaching:**

The early introduction of modern languages in the school syllabi used the same methods which had been developed for the teaching of Latin, with textbooks consisting of statements of abstract grammar rules, lists of vocabulary and sentences for translation, constructed to illustrate the grammatical system of the language and bearing no relation to the real language of communication (Richards & Rodgers, 1985). This method or approach was known as the 'Grammar-translation' method, still widely used at the beginning of the second half of this century and perpetuated in many universities and 'Public' schools. In



this approach, the process of language learning was seen as one of memorization of rules and facts necessary to understand and manipulate the morphology and syntax of the foreign language. The emphasis was on reading and writing and no attention was paid to the skills of speaking and listening. The sentence was the basic unit of language teaching and practice, words were taught in bilingual vocabulary lists and grammar was taught deductively, i.e. the rule was stated, explained and demonstrated before it was practiced through translation exercises. These rules were arranged sequentially in a systematic way, from the simplest to the more complex linguistically. The students were generally taught in their native language. This style catered for academically-gifted students (Cook,1991:134).

As opportunities for communication increased with greater mobility, a need was created for greater oral proficiency, which spurred an interest in the way children learned languages and led to attempts at developing teaching methods from observation of child language learning. The Reform movement in language teaching advocated the study of the spoken language, phonetic training, the use of conversations and dialogues and an inductive approach to the teaching of grammar. New elements of vocabulary were to be introduced by establishing associations within the target language itself, rather than the native language. Discussions led to a more careful selection of what was to be taught, to the arrangement of the syllabus content into 4 skills (Listening, Speaking, Reading and Writing) and the grading of materials from simple to complex (Sweet,1899). Reformers also used the newly established International Phonetic Alphabet, which allowed the learner to translate accurately the sounds of any language, and used an oral based approach to the introduction and practice of the new items of language, which should be heard first, presented in sentences and sentences practised in meaningful contexts. Grammar rules were to be taught only after sufficient practice of the grammar points in

context, i.e. inductively. An interest in developing principles for language teaching out of the naturalistic principles of language learning such as those seen in first language acquisition led to the development of 'Natural' approaches such as the Direct method.

### Direct method

According to the 'Direct Method', languages could be taught without recourse to translation or the use of the learner's native tongue, provided that the meaning be conveyed directly through demonstration and action, i.e. through the use of mime, demonstration and pictures. The best way to learn a language was to use it actively in the classroom and learners would then be able to infer the rules of grammar from the set of examples used and practiced. Known words could be used to teach new structures and old structures to teach new vocabulary. This approach, successful in private language schools such as Berlitz, proved difficult to implement in public secondary education, as it required teachers with near native fluency and depended enormously on the teachers' skills.

### Oral/situational approaches

More eclectic combined approaches developed, combining Direct Methods techniques with more controlled grammar based activities (Richards & Rodgers, 1985).

Palmer (1921) and Hornby attempted to develop a more scientific foundation for an oral approach than that evidenced by the Direct Method and resulted in a systematic study of the principles and procedures to apply to the selection and organisation of the content of a language course. In his writing Palmer (1917,1921) emphasized the problem of grammar for the foreign learner and his research was directed towards the development of classroom procedures suited to teaching basic grammatical patterns through an oral approach, which led to the emergence of the Oral approach. The Oral Approach sets out

systematic principles of selection, gradation and presentation of grammatical structures, based on structuralist principles, which state that speech is the basis of language and that structure is at the heart of speaking activity. The basic grammatical structures of English were described in terms of pedagogical units relating to word order, structural words, inflexions and content words.

A different focus was adopted by the American linguists with the notion of situation. In the situational approach, the principal classroom activity is the oral practice of structures in the form of controlled sentence patterns to be given in 'situations', designed to give the greatest amount of practice in English speech to the pupil. Language is viewed as a purposeful activity related to goals and situations in the real world. The underlying learning theory is the Behaviourist /habit learning theory, in which "learning consists in acquiring good habits, initially by repetition" and "a good response must be rewarded in some way" (Bell,1981). Practice and reinforcement of these good habits lead to the responses becoming automatic. Palmer (1964:136) identified the sets of good habits to be developed in learning a language as "receiving the knowledge or materials, fixing it in the memory by repetition and using it in actual practice until it becomes a personal skill". The oral/situational method adopted an inductive approach to the teaching of grammar: the meaning of words and structures was not to be given through an explanation but to be inferred from the way a form was used in a particular situation. Extending structures and vocabulary to new situations took place by generalization and the learner was expected to apply the language learned in the classroom to other situations outside the classroom. The same process as in first language acquisition is thought to occur in second and foreign language learning.

The objectives in syllabus design are the mastery of the four basic skills approached through structure. Accuracy is seen as crucial and errors are to be avoided at all costs. The

syllabus consists of a list of structures and a vocabulary list to be covered. Structures are to be taught within sentences and the vocabulary is in the form of a list. New material is to be presented in 'situation', i.e. through the use of concrete objects and realia or actions with gestures which demonstrate the meaning of new items. Sentence patterns are demonstrated with examples and there is no translation. Practice is achieved through a combination of activities, involving guided repetition, substitution activities, chorus repetitions, dictation, drills, controlled oral based reading and writing tasks. The learners repeat, respond to questions and commands, but have no control over the content or type of learning. Incorrect habits are to be avoided, especially in the initial stages of instruction. Later on more active participation is encouraged, with the learners initiating responses and asking each other questions.

The whole process of instruction is controlled by the teacher, from introduction to practice. The teacher models the language, presents the materials and can be assimilated as the skilful conductor of an orchestra, or a manipulator, using questions, commands and other cues to elicit correct sentences from learners. The teacher is always trying to spot grammatical and structural errors to include them in a subsequent lesson and is responsible for the timing, the control of the oral practice, revision as needed, testing and development of language activities. The materials include textbooks and visual aids (wall charts, flashcards, pictures, stick figures, etc). The textbook is to be used as a guide to the learning process and the teacher is meant to be the master of the textbook.

All situational and oral approaches are synonymous with extensive oral instruction which focuses on immediate and accurate speech with little grammatical explanation, makes extensive use of the target language as the medium of instruction, requires small classes (ten or less), stresses the importance of the common structures and minimises the amount

of vocabulary which has to be learnt only in context in an attempt to offer sustained practice in the use of language.

The lack of methodological basis for such eclectic approaches and the need perceived to use the target language in the classroom led to the emergence of Audiolingualism.

### Audiolingualism:

The Audio Lingual method holds that language learning is like any other form of learning, that the rule governed system of language can be formally organised to maximise teaching and learning efficiency, and stresses the mechanistic aspects of language learning and language use. It is similar to Situational Language Teaching in the order in which the language skills are introduced and its focus on accuracy through drill and practice in the basic structures and sentence patterns of the target language. It has stronger ties to linguistics, with its linguistic description based on Structuralist Linguistic Theory.

The syllabus is designed around a progression of linguistic structures, increasing in linguistic complexity and difficulty, whose order of presentation is derived from the combination of contrastive analysis and a lexical syllabus of basic vocabulary items. Fries & Fries (1961) graded the corpus of structural and lexical items in three levels with suggestions as to the situations that could be used to contextualize them. The skills to be acquired are divided into four distinct and separate skills, to be practised in a set order : first listening or training in aural discrimination of basic sound patterns, followed by speaking (imitation and repetition), reading and at last writing. In this approach, the vocabulary only plays a secondary role. Grammar rules, if mentioned at all, are taught inductively, after much practice of the structures involved in context. The teaching sequences are based on a combination of dialogues and drills. Dialogues are used to contextualize the key structures and illustrate situations in which these can be used,

repeated and memorised. Emphasis is placed on correct pronunciation, stress, rhythm and intonation. Specific grammar patterns are then selected from the dialogue and become the basis of various kinds of drill and pattern practice exercises, including listening to the dialogue, repeating it, acting it out, followed by drill and practice of new grammatical points. This sequence is then expanded by follow up activities, copying out, variations of structural items or short compositions and finally work in the language lab.

Learners are seen as organisms that can be directed by skilled training techniques to produce correct responses. The focus is on the external manifestations of learning rather than on learner internal processes. Learners play a reactive role by responding to stimuli and have very little control over the content, pace and style of the learning. Learners do not always understand the meaning of what they are repeating, but this is not perceived as a drawback, as they are learning a new form of verbal behaviour. The teacher plays a central and active role in the learning as he is responsible for modelling the language, monitoring and correcting the learner's performance. Strong emphasis is placed on the right training for the teacher, as the method itself cannot be blamed for the failure of learning, which is to be attributed to improper application of the method (Richards & Rodgers, 1985). Instructional materials are used to assist the teacher to develop the students' language mastery. They are generally teacher-oriented and include textbooks containing the structured sequence of lessons, dialogues, drills and other practice activities. Tape-recorders and audio-visual equipment play a central role as taped exercises provide accurate models for dialogues and drills. Language labs are also seen as a very useful alternative to classroom practice.

Various criticisms have been levelled at Audio Lingualism, including Chomsky (1969) himself, who considered its theoretical foundations, based on behaviourism, to be unsound, because they were incapable of accounting for the creativity and uniqueness of

individual sentences. Besides, practical results fell short of expectations, as students were unable to transfer skills acquired in the classroom to real communication outside. Yet many of the current language lessons are still greatly influenced by the audio-lingual drill practices and many of its practices are still to be found, even disguised and implicit in lesson planning and preparation in secondary schools.

The whole audio lingual paradigm of Pattern practice, drilling and memorization was therefore called into question. Temporary relief was offered by Chomsky's cognitive code learning and Carroll (1989) called for a view of learning that allowed for a conscious focus on grammar and acknowledged the role of abstract mental processes. This entailed that practice activities should involve meaningful learning and language use and that learners should be encouraged to use their innate and creative abilities to derive and make explicit the underlying grammatical rules of the language. However, though there was a considerable interest in the cognitive code theory in the early seventies, no clear methodological guidelines emerged, nor did any particular method incorporating this view of learning.

### Communicative language teaching

British linguists emphasized the functional and communicative potential of language and saw the need to focus on communicative proficiency rather than on mere mastery of structures. Candlin (1973) and Widdowson (1978) were inspired by the work of Halliday (1975), Austin (1962) and Searle (1969). Moreover, the creation and unification of Europe, and the Council of Europe, spurred a flurry of conferences, monographs and books on language teaching, in which the behaviour of native speakers was analysed in terms of functions and notions.

Many teachers based their classroom teaching on 'communication' and developed a number of techniques to encourage communication in the classroom, which evolved into two distinct styles, the 'social communicative' style and the 'information communicative' style.

The social communicative style is based on the 'interpersonal' function of language, inspired from Halliday (1975), with an emphasis on spontaneous production and comprehension. The syllabus lists the aspects of communication most useful to the students in terms of functions and notions, leading towards use of the target language in an international situation, i.e. talking to people in another country, with an accent on travel and tourism. Meaningful use of the L2 promotes learning. Communication is a dynamic process, which can be stimulated through well designed task based activities, i.e. information gap and role-plays, imitating what goes on in the world outside the classroom in a controlled form. L2 learning happens automatically provided the right opportunities for interacting with other people are provided. After controlled practice, learners move on to freer practice, involving improvisation of dialogues and problem solving tasks. Topics for simulated conversations vary from booking a plane ticket, reserving a room in a hotel, ordering a meal in a restaurant, etc.

The teacher is no longer supposed to be a dominant figure continuously controlling and guiding the students, but more autonomy and control is conferred on the students, who make up their own conversations in pairs or groups and learn language by doing, sharing and negotiating the curriculum and decisions in the learning process. Emphasis is not on errorless speech in native terms as in the other styles, as the pupils devise their own strategies to communicate appropriately to the task. Teachers provide some feedback and correction, but this role is not as central as in the other styles.



'Autonomous' learning provides an interesting concept for the more individualised learning which can be provided by computers. It aims for the learners to eventually be able to assume responsibility for their own learning (Holec,1980). With full autonomy, learners then become independent of teachers, institutions and specially prepared materials.

Particular skills need attention if the learner is to develop full autonomy, i.e. monitoring progress, reports, continuous assessment and evaluation and a constant reappraisal of the language learning process itself. Work consists of individual and group project work with experiential, decision making, responsibility taking and discussion cycles. Focus is on the process of learning rather than on the product and the activities are supposed to be differentiated, open ended, authentically communicative, adapted to learners' individual needs, interests and values and to give them scope for personal development (Dam,1990).

The teacher becomes a manager of the learning and facilitates the learning process by providing appropriate authentic materials (newspapers, cassettes, radio broadcasts, videos and satellite television), training the learners in the use of adequate up-to-date technology and resources and developing the learners' awareness and use of effective learning and self-evaluation techniques. Through constant joint negotiation, planning and evaluation of the learning objectives and activities, teachers therefore help the learners become active participants in the social processes of learning, active interpreters of new information and decision makers (Little,1990).

Unfortunately, an appropriate educational framework for its development and definite goals for which to train the learners are still sadly lacking. It is very difficult to implement within an institutional education system. Though Social Communicative language teaching aims at giving more autonomy to the learner, what happens in real classrooms has not sufficiently altered, as authentic communication is still rare, as the focus is still

often greater on form and accuracy than on the message conveyed, very little negotiation occurs and the teacher or coursebook still plays a prominent role (Nunan,1987). Moreover, some learners may be resistant to autonomy, which implies a continuous challenge to their roles and certainties (Legutke et al,1991).

When grammar is at all considered, its introduction and practice is often identical to that in audio-lingualism, as witnessed by the substitution tables encountered in many communicative textbooks. Moreover the sentences produced are often deviant from the ideal target language, as learners often practice their communication with each other. (Cook,1991).

This type of learning also requires teachers to have a deep knowledge of language acquisition theory, of the learning processes, of communicative skills training and of principles of learner autonomy and to have developed appropriate classroom and resources management skills (Holmes,1990). This is not a tall order as some of these skills cannot be acquired without prolonged experience in the classroom and need constant updating and revising (Willems,1993). Besides, as we have seen in Chapter 1, much of the knowledge and skills required from the teacher to promote learner autonomy is still being widely explored and researched. It would greatly benefit from research into learner strategies. However, this aspect of language learning and teaching has a great potential in connection with the use of computers in language teaching.

The social communicative approach can be historically linked to the idea of 'Interlanguage', in which learners develop their own language systems, and to ideas of Universal Grammar, i.e hypothesis testing, in which "the students are using natural processes of learning built in to their minds" (Cook,1991:141). However, it places little emphasis on pronunciation or vocabulary, takes little account of speech processing or

memory limitations and overlooks the potential role of the L1 knowledge. It must therefore be sure to adequately cover all language components, to achieve its goal of communicative competence.

The other variation, the information-communicative style views communication as an exchange of ideas, emphasizing the information transferred rather than social interaction (Cook, 1991:143). It focuses on language use, with comprehension followed by production.

The Total Physical Response (TPR) style is an example of such a style, (Asher,1977), promoting learning by imprinting connections between the right and left hemispheres of the brain, to connect the experience of learning a new language and facilitating the assimilation of language structures by accompanying it with physical responses as these structures are being introduced and practised.

It mostly relies on the individual teacher's preparation and improvisation with the class. A possible lesson might include a preview stage, in which the necessary language and structures are explained, a task listening exercise, with relevant gap-filling exercises and series of relevant questions, followed by written tasks of the same calibre. Students listen actively but are not required to produce actual sentences until they are ready. When learning the imperative, learners are first shown commands or instructions, with comments in the target language, asked to respond to them physically, to execute them and finally directed to produce these instructions for other learners. It is hoped that physical involvement helps the learners to contextualize, memorize and assimilate the language used. The learning is dominated by the teacher, who provides the language input in the form of materials or activities.

It is questionable, however, whether this approach can be easily applied to more abstract concepts. It offers no guidance on how to string words and sentences together and how to construct discourse. There may also be a danger that too much reliance on listening fails to train the learners to communicate effectively or engage successfully in interaction with the world outside. It may not suit introverted or shy learners and may be unsuitable for large groups, given the amount of movement required. It draws its strength on information exchange, concerned not with the processes of learning but with the conditions for successful learning.

#### The 'Natural' approach:

The Natural approach, whose theoretical foundations were explored in Chapter 1 was devised as an attempt to incorporate the 'naturalistic' principles researchers had identified in studies of second language acquisition to the teaching of languages, initiated by Terrel (1977), later joined by Krashen in this approach. The combined statement of their principles has been published in a common book called the 'Natural Approach' (Krashen & Terrell, 1983), in which Krashen deals with the theoretical issues and Terrell with the classroom procedures. The term 'natural' merely emphasizes the belief that the principles underlying the method are to conform to the principles of language learning in young children.

The authors also relate their approach to the Direct Method. However, unlike the Direct Method, they place less emphasis on teacher monologues, direct repetition, formal questions and answers and focus less on accurate production of the target language. The emphasis is on 'input' rather than practice, with optimization of the emotional preparedness for learning, attention to aural materials and the use of written and other materials as a source of comprehensible learning, with vocabulary playing a central part and grammar

determining how the lexicon is exploited to produce messages. Language learning, as with Audio-linguists, is a process of mastery of structures by stages. In order to progress to the next stage, learners need to understand input language that includes a structure that is part of the next stage.

Grammatical structure does not require explicit analysis or attention as conscious 'learning' can function only as a 'Monitor' or editor that checks and repairs the output of the acquired system. The successful use of the Monitor is limited by time, focus on form and knowledge of the rules. Acquisition of grammatical structures proceeds in a predictable order. Errors are signs of naturalistic developmental processes and in the process of acquisition, similar developmental errors occur independently of the mother tongue of the learner.

Therefore, according to this approach, language teaching must provide as much comprehensible input as possible, whatever helps comprehension is important, i.e. visual aids and exposure to a wide range of vocabulary, the focus of the instruction should be on listening and reading, and student work should centre on meaningful communication rather than on form. Comprehension is made possible by clues based on the situation and the context, extralinguistic information and knowledge of the world. As in first language acquisition, where children are provided with samples of 'caretaker speech', adults are provided with simple codes that facilitate second language comprehension, as in 'foreigner talk' or 'teacher talk' in the classroom, characterised by a slower rate of speech, repetition, restating, use of yes/no instead of 'wh' questions. The teacher focuses on objects in the classroom and on the content of pictures. The teacher must talk slowly and distinctly, progressing from one word answer through to yes/no questions, then to either/or questions and finally to questions that the students can answer. The focal point for questions is

provided by charts, pictures, advertisements and other realia. Pair or group work may be used, leading at times to whole class discussion.

As the learners' emotional states or attitudes can facilitate or block acquisition, the syllabus should be tailored to the learners' needs, and expectations should be stated clearly. To minimise stress, learners do not need to say anything until they are ready, but are expected to respond in other ways. Course organisation includes a list of typical goals, expressed in terms of situations, functions and topics, which are meant to derive naturally from the needs of the students, but not always realistic as it is difficult to specify communicative needs that fit the needs of all students.

There is nothing new in these techniques that are borrowed from other methods, and activities include Command-based activities from Total Physical Response, mime, gestures and context to elicit questions and answers as in the Direct Method, and even Situation-based practice of structures and patterns. Group work activities are often identical to those used in the communicative approach.

However, if language learning necessarily occurs in the right conditions and with the right comprehensible 'input', these will have to be specified more precisely to make this approach successful. More research also appears to be needed into acquisition sequences, learning processes and learner's needs.

#### Other methods

A full review of language teaching methods would include other teaching styles which have appeared in recent years some of which mark a radical departure from the styles below, either in their goals or execution by giving a more active role and greater autonomy to the learner. These methods are usually classified as 'alternative', 'humanistic' or 'self

access' or 'self-directed' learning, and include 'Community language learning' and 'Suggestopedia'. They are relatively rare in UK and therefore it is difficult to find opportunities to observe classes following these methods. They are not based on any particular theory of language or very much concerned about language elements and their organisation. Because of this, and their relative lack of impact, they are excluded from this review as they are unlikely to contribute very much to our understanding of the relations between the theory and practice of language teaching.

### Conclusion

As we have seen in our overview of the teaching methods considered, there is no perfect way to teach a language and most teachers end up by using a combination of teaching styles to suit their personalities and the needs, abilities and goals of their learners. These needs are complex, as is witnessed by the failure of SLA research to provide an adequate model for second language learning. Teachers cannot wait for a successful answer to some of the vital questions still being investigated by SLA research. The teacher has to teach the student, and respond to their needs in whatever way may be necessary. Though "considering teaching from an L2 learning perspective" ..may .. "lead in the future to a more comprehensive, scientifically based view of language teaching" (Cook, 1991: 152). "Curriculum developers typically proceed with caution, since there is a great deal that is unknown about second language acquisition and little justification for uncritical adoption of rigid proposals" (Richards & Rodgers, 1985: 158).

Changes of fashion in the teaching methods do not necessarily alter the styles and techniques adopted by the language teachers in the classroom. Just as 'grammar' can be taught through a variety of styles, functions, such as 'asking directions', can be taught and practised in an academic style or audio-lingual drill and practice style. Moreover,

observation of classroom practices is often deceptive as "a casual observer may not be aware of the the philosophy underlying the classroom techniques he or she observes." (Richards & Rodgers, 1985: 136).

### **2.1.2. Should grammar be taught?**

So, what should be the role of formal instruction in second language teaching? It appears nearly impossible to mirror the conditions of a natural setting in a classroom situation, as formal settings very rarely offer the same opportunities as naturalistic settings, given the time provided for second language acquisition, the lack of individual attention and tuition, the nature and richness of the interaction and input.

The debate about whether the learners can learn their second language in the same way as first language learners, i.e. inductively, raised some fundamental questions and led us to review the role and value of formal instruction in Chapter 1. If we are to assume that it is possible to acquire a second language in the same way as a first, i.e. inductively, then it might be sufficient to immerse the second language learners in an environment in which they are exposed to as much target language as possible. Learning and acquisition will automatically follow and it will not be necessary to teach the rules of grammar and the grammatical structures involved in language use in a formal way.

Further, if we are to assume that there is an invariant order of acquisition of such structures for first language learners, that second language learners follow their own path towards the acquisition of their second language, they might be better off to progress at their own rate, using their own strategies, leaving the learning to take care of itself. On the other hand, formal instruction could well make a difference by providing the learners with the right conditions and the right learning environment, the right materials in the right sequence and the right explanation.



Ellis (1990:191) argues that instruction can have a direct effect on the acquisition of specific linguistic features. Instructed learners have a tendency to outperform naturalistic learners.

Schmidt (1983) demonstrates that though they become efficient communicators, naturalistic learners sometimes fail to develop high levels of linguistic accuracy.

Instruction can also help the acquisition of useful formulas, as learners memorize routines and patterns, which they later reproduce in speech. (Weinert,1987; Pienemann,1984).

Instruction can also have a direct effect on the learner's ability to perform the target structures in natural communication. However, not all structures are teachable and teachable structures have to be taught at the right time. Instruction has an indirect, delayed effect and contributes to declarative rather than procedural knowledge. Therefore, conscious knowledge may help to accelerate the learning and be necessary to avoid fossilization (Ellis,1990:170).

There are two possible approaches to the teaching of the structures of a language: practice and consciousness raising.

Practice aims at developing automatic control of grammatical structures to enable the learners to use them productively and spontaneously. It is behavioural, mechanical and rigidly controlled, contextualized and communicative. Practice isolates a specific grammatical feature, requires the learners to produce sentences, to repeat that feature, correctly and provides feedback on the performance. Practice is often preceded by a presentation stage, involving an inductive or deductive treatment of the structure and sometimes rounded off with a formal explanation. Even if practice is directed at the

implicit learning of a structure without any formal explanation, "learners are likely to construct some kind of explicit representation of the rule" (Ellis,1991:235).

However, there are strong doubts about the achievability of its aims. Practice does not necessarily cause learning, it does not necessarily enable the learner to use the structure freely (Ellis,1984; Ellis & Rathbone,1987). The effectiveness of practice has also been put into question by the teachability hypothesis, according to which a structure cannot be successfully taught, i.e. used correctly and spontaneously in communication, until the learners have reached the necessary stage of readiness for its acquisition (Pienemann,1985). Furthermore, there are constraints "that exist on the teacher's ability to influence what goes on in the learner's head from the outside" (Ellis,1991:237).

Consciousness raising, the alternative approach, is concept forming, focuses the attention of the learner on the linguistic feature, provides illustrating data and perhaps an explicit rule, demands an intellectual effort from the learner, that of understanding the targeted feature. It can also provide clarification in the form of further data or an explanation and sometimes requires the learners to articulate the rule. It does not involve repeated production and leads to explicit knowledge of the rules of grammar (Rutherford and Sharwood-Smith,1985). It does not contribute directly to the acquisition of implicit knowledge, i.e. the integration of a representation of a new linguistic feature into the mental grammar, but prepares the ground for this integration when the learner is developmentally ready. It does not result in immediate acquisition but will have a delayed effect.

Consciousness raising is an approach compatible with current thinking about L2 acquisition of structures and is in agreement with progressive educational views promoting discovery of grammar rules through problem-solving tasks. It has its

limitations, may not be appropriate for young learners, may be disliked by experiential learners and can be used as a complement to communicative activities (Ellis,1991:241). Therefore, it appears to have an important role to play in language teaching.

Formal instruction is often pitched at a compromise level, that of the average pupil in the class (Ellis, 1985). What is likely to be affected is not the order of acquisition but the rate of learning. However, we have seen in Chapter 1 that research has only identified such an order for very few structures and languages, and that a lot of work still needs to be done in that field. Therefore the best that a teacher, a teaching programme or a CALL program may be able to do is to experiment with these.

Moreover, the move away from grammatical accuracy appears to have grave consequences on the linguistic performance of the learners, especially at an advanced level. An emphasis on communication skills can lead the students to believe that accuracy is unimportant as long as the message is conveyed. (Metcalf,1992; DES,1990). Examination objectives have been changed to concentrate on 'communicative competence' in the four skills of listening, speaking, reading and writing, with less emphasis on grammatical accuracy. This had led the various examination boards to lament themselves about this state of affairs. Communication is clearly highly dependent on accuracy:

" The importance of matters such as correct genders and agreements is not always stressed, because it is possible to obtain a reasonable GCSE grade without observing these rules. The principle of rewarding anything which would be understood by a sympathetic native speaker had apparently led to a decline in what is expected of candidates in 'Writing'. (SEG,1991:1).

"Students and teachers should bear in mind that assessment of communicative effectiveness demands greater, not less, accuracy: It is not intended to be a euphemism for an 'anything goes' approach"(SEG,1991:5).

The problem is not only confined to pupils of lower writing ability but also affects the students of languages at a higher level or even degree level. DES (1986:14) links the undergraduates' lack of grammatical competence and ignorance of grammatical metalanguage to their inability to use the language proficiently.

"Many pupils are taught nothing at all about how language works as a system, and consequently do not understand the nature of their mistakes and how to put them right".

Teachers of modern languages in higher education also express the same concerns:

"Most of the students simply do not have a language to talk about language. They could hardly tell you what an adverb is, let alone parse a sentence"(Jacobs,1987:23).

Therefore, managing an appropriate balance between the two is not an easy task. The department for Education and Science in Great Britain, (DFE, formerly Department of Education and Science,DES), advocates primarily a communicative approach to language teaching. However, the DFE has issued a set of guide lines for the teaching of modern languages in the form of a National Curriculum document (DES,1990), which recognises the importance of structure and the complexity of the relationship between communicative competence in a foreign language and awareness of its structure, which is considered as important a factor as knowledge of vocabulary and phraseology in contributing to giving to the learners a sense of progression (id:3.20).

Training in the recognition and use of structures is to be recommended as an integral part of the way the target language is taught and accurate use of language is not to be

underestimated, if misunderstandings are to be avoided. A good understanding of structures is also central to listening and reading. The learners should use them to adapt to the demands of different situations and increasingly to check their own production.

The document also considers the merits of consciousness raising of the structures of the target language. The suggestion is that grammatical structures should be taught as they arise in context.

The National Curriculum document also mentions the fact that a progression is desirable in a teaching programme (id:6.31:40), as though there were some optimal order of acquisition for an L2 , but offers no guidance as to the order in which target language structures should be taught. Instead, it gives a set of general principles to be followed in terms of length of utterances, familiarity of situations, complexity of discourse structure with attainment levels for each of the attainment targets (Listening, Speaking, Reading and Writing).

Further guidelines follow as to the context and manner in which structures should be introduced, practised and consolidated, i.e. the document advises for structures to be taught in a familiar context with known vocabulary, the best mode of learning being the exploratory mode and that demonstrations with a strong audio or visual impact are to be preferred.

The National Curriculum for modern foreign languages therefore stresses the need for providing the learners with opportunities to become more aware of the patterns and structures of the target language they are learning, but gives very few clues as to how this could be achieved. Many teachers have been calling for a greater emphasis to be placed on raising the learners' awareness of the grammatical relations occurring within a language, and there may be a way forward in avoiding the old formalisms and trying to find the right

balance between 'implicit' and 'explicit' teaching, or the 'exploratory' approach, recommended by the DES.

From the review of teaching methods and approaches so far, it is clear that none has fully resolved the difficulties and complexities involved in learning a second language, especially with respect to grammatical awareness. An area yet to be explored is Computer Assisted Language Learning. It may be that the computer is an ideal medium to provide individualised tuition to the students in the area of grammar. Therefore, we shall investigate its potential in the following section.

## **2.2. Computers in Language Teaching**

The use of computers in second language teaching affords us the opportunity to revise critically current methods, and to innovate in ways appropriate to the media, which have to be consistent with theory and the findings of research. In this section, we shall examine some of the available CALL programs for the teaching of languages, consider whether current developments in the field of Artificial Intelligence and Intelligent Tutoring Systems can help us set better foundations for the design of CALL programs and explore the role of computers in second language teaching, be it in a quasi human role such as that of a tutor, monitor or record keeper, or as a powerful media resource, or as a powerful database. This will lead us to specify desirable features for the design of future CALL programs, more flexible and more suited to the needs of the learners.

### **2.2.1 CALL Tutorial Programs**

CALL tutorial programs are a subset of teaching materials and programs designed for teaching second languages in formal settings and should use the same principles to guide their design and mode of instruction. Most of the first generation CALL tutorials

attempted to computerise the kind of exercises already used in the classroom, such as multiple choice questions and answers, cloze passages, gap filling, choosing the right answer from a given set of answers, matching two elements of an incomplete answer, re-ordering elements in a particular answer and reconstructing a text or an answer (Hardisty & Windeatt, 1989).

Most CALL drill and practice exercises belong to the deductive type with variations in the degree and type of imagination, in the feedback and consistency of feedback and in the amount of control given to the learner. Very few encourage the learner to explore freely, save perhaps adventure programs, which are often unstructured linguistically. In the area of syntax, a typical set up is a multiple choice or gap-filling exercise used to practise a particular area of syntax in a preset order with canned responses, which the learner has to complete to get a score. Some of the errors are corrected immediately and others at the end of the exercise. These activities are rarely varied, and though they individually have some merit, too much focus is often given to the activity type rather than the knowledge to be transmitted, and the activities are often more destined to be slotted into a formal scheme of learning.

The user might be asked to type in a number for the right answer, or the missing element in an answer or to use a particular key on the keyboard to pick the appropriate answer. All the answers are then pre stored or canned and the programs very rarely allow for alternative answers. The students have to find out what the computer expects them to do and what answers the computer will accept.

These programs all require the skills of a teacher as a guide and manager. The teacher has to plan the scheme of work, integrate the computer activity within the set of other classroom activities, set up the machinery and hardware, and must be at hand for trouble-

shooting with the equipment. This requires that the language teachers be familiar with the use of both hardware and software so that their students can be trained in the necessary computer skills to make adequate use of the programs.

The alternatives to drill and practice exercises are the 'home' programs, which deal with adventures and simulations on personal computers, usually involving the user in an imaginary world in which various situations are encountered and problems have to be solved are not so teacher-centred. The language work consists of answering questions and giving instructions to the computer to find a way out of a maze or solve a particular problem. However, these programs are quite difficult to use and more suitable for advanced learners (Hardisty and Wideatt, 1987:53).

Furthermore, the language content of commercial games is often too exotic and does not belong to the mainstream of language teaching. 'Treasure hunts', a sample adventure game, are designed to help students practise oral fluency using an adventure and a simulation program, e.g. 'If I ruled the world', and to give the students oral fluency practise. The computer is used in those cases to stimulate oral activity, rather than as a stand alone medium.

In a more recent overview of grammar software for undergraduates, Glencross (1993), arrived at the following evaluation of dedicated CALL programs. There had on the whole been an improvement in the flexibility and user friendliness of the software tested, with the learner being given more control and flexibility over the learning process, in terms of duration, sequencing and in the pattern of the interaction with immediate feedback and prediction of errors, objective measurement of improvement in performance of the students through scoring had become more flexible. Texts or samples of language



provided were also better suited to the learners' needs and interests and were available in new formats, i.e. Hypertext and made greater use of cross-referencing.

However most of the criticisms were directed at the linguistic content of the programs and concerned either the format of the explanations provided, which very often were very traditional, or the type of tasks set, which often relied on translation exercises or multiple choice and gap filling question and answer types, and text reconstructions. The description of the grammatical framework usually lacked insight and explicitness. The main problem identified for teaching CALL software was the integration of the acquisition of grammatical knowledge and communicative competence, "with or even without the assistance of computers into the general experience of language learning" (Glencross,1993:26). Therefore, the use of software designed for alternative purposes, i.e. spelling programs, spell and grammar checkers and business language software to increase the awareness of grammar in the language learners was to be recommended.

The dedicated programs have also had a greater popularity in schools, as these have found it difficult to reconcile the inflexibility of traditional CALL grammar software with the demands of a communicative syllabus and the recommendations of the National Curriculum. In language classrooms across the UK, the programs the most used are target language word processors, target language databases and spreadsheets, electronic mail, text reconstruction programs and occasionally the odd CALL program or simulation. But the use of dedicated CALL software has never really taken off in a big way. As far as school packages are concerned, most are based on programmed learning and therefore behavioural, and designed for basic computers with a very small memory and lack flexibility. Moreover, these school programs do not take into account the previous knowledge of the learners.

### **2.2.2. The computer as an intelligent tutor**

Can AI help us design better and more 'Intelligent' programs or systems, with instruction better tailored to the individual user ? Can the programs be designed to take into account the learner's previous knowledge?

As pointed out by Matthews (1992:13), there are two possible approaches in 'going AI', i.e. ICALL programs could simply attempt to ape intelligent human behaviour or attempt to understand the mechanisms underlying intelligent behaviour, by testing current theories of second language acquisition. ICALL could provide a framework to help the researcher gain a deeper understanding of the language learning process. Unfortunately, as seen in the Chapter 1, the theories and models of language learning available to-date have not reached the degree of formality required for their implementation and modelling into an ICALL program.

One of the most popular AI-influenced developments has been the experimental design and implementation of Intelligent Tutoring Systems (ITSs), derived from medical and other Expert Systems, which attempted to model the behaviour of doctors in diagnosing some types of illness, (e.g. CASNET). Linguists and AI researchers therefore extended the expert system architecture to ITS's, which aimed at monitoring a student's work, correcting errors, assessing proficiency level and proposing exercises at the appropriate level through a more flexible control structure. The ITS's architecture classically involves three interlocking modules, an expert module (EM), containing the knowledge to be modelled, a student module (SM) containing a model of the student knowledge at different stages in the learning process and a tutoring module (TM), determining what should be taught and how (O' Shea & Self, 1983). All these three areas were to be explicitly represented, which is often not the case with traditional CALL programs (Matthews

1992,1991). There are problems with the implementation of all three modules and their integration.

As far as the expert module is concerned, Matthews ( 1992:18) mentions systems, whose expert module is implemented and based on different formalisms (LFG and GB: Lexical Functional Grammar, and Government and Binding) and points out the difficulty of implementing "principle based parsers", which work efficiently. I also saw a system demonstrated at Exeter University, El (O' Brien, 1989, O'Brien and Yazdani, 1988), which envisaged teaching languages with Natural language Processing techniques and found it particularly difficult to handle the issues of free input by the user, i.e. error correction and prediction. The chart parser used recognized as acceptable some erroneous student input and could not handle some very basic errors, which would be expected from early language learners. Moreover, the input processing was slow and double or complex errors are not easy to handle.

The simplest and most common type of student model is the overlay model (Bowerman,1990), which views the errors made by the learners as missing knowledge and the learner's lack of expertise as missing conceptions. However, errors could be caused not only by lack but also by misapplication of knowledge on the part of the student ( Matthews, 1992: 20). Learners would either only have a subset of the rules they are intended to learn or only be able to apply a subset of the path equations applicable in a particular rule, i.e. not know all the conditions of its application. (Catt,1988; Catt & Hirst,1990; Chen & Barry,1989). Catt (1988) assumes that the missing equations are due to overgeneralisation, but it is conceivable that the "missing paths equations might be due to some form of natural ordering of acquisition" (Matthews,1992) or "to interference from the first language", (Odlin,1989). Therefore, this type of model does not reflect the processes of SLA adequately.

Other approaches to student modelling might be more appropriate in those cases, i.e the buggy approach, in which students entertain misconceptions, produced by mal-rules or incompetence rules. The concept of 'malrules', (Sleeman;1982), initiated as misapplied rules for mathematics, is well illustrated by an example from Wenger (1987), involving incorrect ordering of procedures in the solving of an equation:

***CORRECT VERSION***

*Solve  $2X = 3 \cdot 4 + 5$*

*Do multiplication:  $2X = 12 + 5$*

*Do addition:  $2X = 17$*

*Divide by 2:  $X = 17/2$*

*Result:  $(17/2)$*

***MALRULE VERSION:***

*Solve  $2X = 3 \cdot 4 + 5$*

*Do addition:  $2X = 3 \cdot 9$*

*Do multiplication:  $2X = 27$*

*Divide by 2:  $X = 27/2$*

*Result:  $(27/2)$*

The correct solving of this algebraic expression involves first multiplying 3 by 4, then adding 5 to the result, then dividing this last figure by 2.. In the malrule example, the learner starts reducing the right hand side expression, but he has added 4 and 5 together first, then multiplied the result by 3, before solving the equation and giving out the result. The wrong result can be explained as a misapplication of the principle of associativity in a complex mathematical expression. Wrong ordering of rules or misapplication of operating principles are given the name of malrules. Even in Mathematics, it is not easy to detect the mental processes occurring in a learners' mind which lead to a particular type of error. The same types of errors can be found in the errors made by language learners.

In this process, samples of errors are collected and analysed and mal rules tried out to produce the same mistakes. If the mal-rules generate identical errors to those of the students, then the students are assumed to have the misconceptions represented by these mal-rules.

In Schwind's system, there are some mal rules to handle faulty word order (Schwind,1990) and Weischedel (1978) uses a similar approach. Scripsi (Catt & Hirst,1990) and VP2 (Schuster, 1984) use two grammars, that of L1 and L2 to parse the student's input, with the same production mechanisms. However,Matthews and Fox (1991,24) argue that most 'incompetence' models are unintelligent, "because all misconceptions are anticipated and pre-programmed".

Not all expert modules are based on Natural language processing parsers, which may not always be necessary to handle the learner's input in the way desired. An interesting example is Gender Mender, the expert module of a system attempting to model the rules used by native speakers about French grammatical gender. It is designed for advanced learners who already possess a wide vocabulary to help them master the arbitrary gender system in French (Ferney, 1989). It uses an expert module based on the research into grammatical gender performed by Tucker, Lambert & Rigault (1977).

Tucker et al. (1977) have formulated a rule system of the native speaker's skill with grammatical gender. By compiling an inverse dictionary, consisting of all the nouns listed in the Petit Larousse, grouped by endings and separated according to gender, and tabulated into masculine and feminine and the corresponding suffixes, they were able to predict what gender French native speakers would assign to nouns, according to their endings. These predictions were then tested on native speakers. Whereas the gender of common nouns was learned and had become automatic, that of unknown or made up nouns was worked out using a number of heuristics or rules of thumb. New nouns were processed backwards and an educated guess was made as to their gender. These heuristics did not always lead to the correct answer, but managed to predict accurately the gender of about 2 /3 of French nouns.

Ferney's expert module was designed to model the behaviour of these native speakers to help his advanced students of French acquire these heuristic principles as he felt that this may be a desirable skill to have. Ferney's expert module was tried out by Farrington's students who reported that they felt they knew less after the program than before (Farrington,1989).

According to Laurillard (1988), not only are learner models difficult to produce but also unusable because of the lack of principles for selecting the teaching action appropriate to the source of misconception. Some misconceptions cannot be modelled yet, i.e., semantic mis-interpretations and real world conceptualizations. It is probably the case that the same applies to second language learners. In Chapter 3, we will give an idea of the number of rules needed to parse a simple French nounphrase and the number of possible errors or combinations of errors and their possible corrections and remedial strategies.

Chanier et al (1990) argue that the tutoring model not only requires an adequate linguistic formalism to develop a parser, but the system also needs a pedagogical grammar in some form or other, understandable by both the student and the teacher using the system for the explanation module. The form of the pedagogic grammar is also an important design decision. This pedagogical/explanation module would sit between the expert module and the student module.

BELLOC (Chanier et al,1990) aims at developing methodologies for the acquisition of student models, using experimental scenarios for second language learning. To compensate for the lack of general procedures of knowledge acquisition of learner's rules and of a more formal description of the learner's processing, the research plans to semi automatise the student modelling, initially implemented for the benefit of an expert

teacher to analyse students' performances. However, the report does not provide any great detail about actual implementation.

ITSs so far have not successfully achieved their objectives, as many problems still arise from the codification of linguistic knowledge, the lack of knowledge of the processes used by learners and the variability of teaching approaches. There is no doubt that it can prove a valuable exercise for teachers and/or knowledge engineers to attempt to codify the expertise and reasoning of the teacher and analyse and re-assess current teaching practices in the light of learning theories and models. It seems hardly probable however that the computer will ever replace teachers, as these machines cannot communicate with humans and can only utilise the knowledge programmed into them according to well-defined and formalised algorithms. There is actually a certain amount of doubt about whether even an expert teacher would be able to assess, monitor and correct a student's work and give the correct explanation instantly. Even the best teachers usually follow a set of procedures based on a particular text following a syllabus or predetermined progression, varying the types of activities and the amount of practise to suit both the needs of their students and their own system of beliefs about language learning and teaching. Many would be very hard pressed indeed if asked to specify, explain and justify their methods and decisions to a knowledge engineer. This is not a new problem: attempts at codifying and formalising an expert's knowledge are always fraught with many difficulties, because the expert cannot analyse and formalise his/her knowledge in such away that it can be reduced to a computer algorithm.

The problem seems to lie in the different models used by the learner and the teacher or computer. The learner builds his/her own system of rules, which may be inconsistent and unstable as hypotheses are tested, and rules are restructured in the learning process, proceeding or not towards mastery, therefore the teacher and learner are using a different

rule system. The student's model has to be different from the teacher's model and this would also seem to apply to the domain of second language learning. The model used in second language teaching is often a subset of the rules internalised by a native speaker.

If we are still a long way from Intelligent Tutoring, however, there are still several other ways in which computers can assist language learning.

### **2.2.3. The computer as a monitor, record keeper and research tool**

The computer also has the potential of recording learners' responses. By recording the student's answers and assessing them immediately, the computer can also relieve the teacher of very boring marking and allow him/her to monitor the student's progress more thoroughly and effectively. Errors can then be examined and analysed and decisions made about possible course of actions to help the students with their particular problems in the form of further exercises, modified exercises, additional steps in the learning sequence, additional explanations, etc.

Moreover, the recording of the students' answers and errors can provide an enormous amount of data accessible to second language researchers, who will then have to study the patterns and possible differences in rates and order of acquisition. From the data thus collected, we might be able to arrive at some answers for some of the pressing issues of second language acquisition research. It would also be possible to use the computer to record the timing of these responses and chart the paths followed by the learners during their interaction with the program. There are advantages in the use of computers for this task rather than human beings as the former never get bored, or lose patience and can usually give consistent responses and instant feedback, if necessary or desirable (Higgins, 1987). This is a view also echoed recently by Garrett (1991).



The increased flexibility of the types of learning environments provided by the computer could allow the researchers to conduct experiments on these learning environments with a view to comparing and evaluating them, in a more controlled way than in a classroom situation or an experimental setting. For example CALL programs can be implemented to model different teaching methods or strategies and information collected about their relative effectiveness and the learners' reactions to each of the different strategies.

This could be done by direct recording of the student's responses, and by comparing their scores, the timing of their responses, the paths followed by the learners, the choices made by the learners in each situation. Moreover, by direct observation of the learners' reactions and responses during an interaction and by asking them for their preferences and the reasons for their actions and choices, the researcher can then collect further valuable data on learners problems, misconceptions, and preferred learning strategies. Asking the learners to verbalise their mental processes can provide us with greater insight into their learning processes, at the same time as allowing us to evaluate the program more thoroughly.

#### **2.2.4. Human interaction with computers:**

The use of CALL programs for teaching languages is but one example of the tasks involving computer human-computer interaction or HCI, which is now becoming an interesting field of research in its own right. CALL programs themselves are artifacts which should also take inspiration from the findings of such research involving human attitudes to the computer, and therefore should follow the desirable principles for the design of computer programs and software. By using computers to teach and to learn, both learners and teachers have to be computer literate, i.e. able to use the computer competently before they can derive useful benefits from computer use. The early

computers were difficult to use and the user had to spend an enormous amount of time getting familiar with the commands, the procedures and the programs themselves, as these lacked flexibility and did not allow the teacher or learner very much autonomy.

Many of the CALL programs teaching syntax can be difficult to use. Having tried and tested several CALL packages at the National Centre for Computer Assisted Language Learning Centre (NCCALL) at Ealing College of Education, now Thames Valley University, and at the CTI centre for modern languages (Computers in Teaching Initiative) at Hull University, I found, as a user, that some of the most infuriating features of many such programs included inconsistency in the uses of keys and commands, lack of on line help on how to use the program or no advice on entering accents, inflexibility in the order of use (it was often impossible to switch activities, even in the practice mode) and difficulty in exiting the system (often having to press the escape key and exit the program altogether).

It would seem that it should be in the interest of CALL designers and researchers to have the greatest concern and respect for their users, whether they be the teacher, wanting to browse through a particular program to prepare a CALL lesson or a CALL component to a lesson or the learner, who might be used to more sophisticated equipment and software in the home environment.

From such experience it is clear that CALL programs should use as user friendly a system as possible, i.e.

- (i) be consistent in their design and specifications,
- (ii) be clear as to what the user is expected to do, i.e. provide clear and well written instructions for both the teacher and the learner,
- (iii) be easily alterable to suit the teacher's requirements and

(iv) provide a stimulating and flexible environment in which the learner can learn.

### **2.2.5. Which way forward for CALL and ICALL ?**

Some of the early CALL systems tried to use computers as books. The whole language course was entered into a computer and comparative studies were made to assess the influence of the computer on second language acquisition, which did not unsurprisingly yield very favourable results.

Computer programs appear to have become more potentially flexible than textbooks and tapes, as they can function as very powerful databases, e.g. foreign language newspapers, articles, dictionaries, etc, which can be explored at will by the learners, capable of dealing with an increasingly greater amount and variety of data, be it linguistic or not.

Since the advent of powerful word processing packages, which allow the user to manipulate and highlight text, use colour and high resolution graphics and even incorporate sound with the possible digital recording of text or sound, it seems possible to devise a powerful integrated teaching system, stimulating all of the learners' input senses. Programs may also control and synchronise the operations of a variety of media, such as a video disk, a tape recorder/player, etc. (cf CD rom disks and Hypermedia), all of which could also provide examples of spoken language in use, which could enhance the presentational qualities of the computer as a resource.

As computers have become not only more powerful and robust, but also tend to be more user friendly, they have increased their usefulness. They can now incorporate visuals and sounds as well as deal with text in a sophisticated manner and control other media. The future success of CALL programs could reside in consistent user-friendly environments, as in WYSIWYG environments provided by Object Oriented environments such as

Hypercard and Hypertext or similar environments, which allow the programmer to incorporate colour, graphics, text and sound and the user to manipulate the interface easily at the click of a mouse.

Overall the lessons learned from these CALL programs and AI projects include the difficulty in handling free input from a learner, the complexities involved in student modelling, the importance of pedagogical considerations and issues of control in the design of teaching programs and the potential usefulness of such projects.

Teachers cannot usually respond immediately to the work performed by the student and instant feedback may allow the student to learn to monitor his/her own progress and choose a particular course of action to remedy his or her own errors. The learner might also benefit by working in a more flexible environment, in which he/she can then take more responsibility for his/her own learning and make his/her own decisions about getting instant feedback or not, being given a clue to the right answer, being given the right answer, knowing his/her score or not, repeating an exercise or not, asking for help from the computer or teacher, in the form of further examples or an explanation, etc.

What is needed is more research into the processes of learning occurring in the heads of second language learners. What we need to assess is whether all learners could benefit from the same strategies or whether a rich learning environment, using a variety of teaching methods would be more appropriate.

### **2.3. Implications and research proposal.**

The main issue emerging from the second language teaching methods discussed above is that in most cases no testing or evaluation has shown any approach to be better than another. Many now favour an inductive approach. The National Curriculum recommends

an exploratory approach. We need not advocate a return to a totally analytic, purely deductive way of teaching languages, as these impede fluency, but favour consciousness raising of the structures of the target language. Most approaches acknowledge that structure is an important element of language learning. However, no teaching method has been outstandingly successful at raising the awareness of the structure of language in the learners. Therefore, it seems reasonable to investigate what contribution the use of computers can make to the teaching of linguistic structure.

As we have not been able to find one teaching approach that is definitely better than another to inspire the design of our teaching program, it is proposed to design a computer program to investigate the approach on which CALL programs should be based, given the state of current knowledge.

The review of CALL programs in the previous section showed that CALL has not yet established a clear role in language teaching, and has not been based on prior theoretical research. From the review, there are several desirable features emerging, which could improve the design of CALL programs for second language learning,:

- basing CALL and ICALL programs on sound pedagogical principles and the findings of second language research and psychology;
- making them more learner-centred and very user friendly and allowing greater flexibility and control to the learner;
- presenting the materials used in the most attractive and consistent way;
- giving clear explanations, both about the use of the computer, the structure of the program and the subject matter to be taught.

It is therefore proposed to design and test a computer program, able to operate in three modes, an 'implicit' mode, in which the rules will not be disclosed and have to be guessed by the learners, corresponding to the 'Communicative' approach, an 'explicit' mode, in

which the rules will be stated first, then practised, corresponding to the 'Grammar' approach, and an 'exploratory' mode, in which the learners will have the choice of the course of action to take, according to their needs and preferences, following the DES recommendation and investing the learner with more autonomy. The pedagogy of the design will formalize some possible ways to raise the consciousness of the learners and evaluate their relative effectiveness.

The program will also have to provide an adequate description of the language in the form of linguistic rules and an explanation module which can be understood by the learners, presented in a way that is comprehensible to the learner.

It will also have to be based on sound pedagogical principles and knowledge of the learner processes used in that particular area. As we have not found any theory adequately accounting for these processes, prior research will be needed as the program will also have to attempt to correct these misconceptions, if possible. This will enable the research to investigate the relationship between approach, learning and topic.

In the next chapter, we shall isolate and explore a domain for the design and implementation of our experimental program through an analysis of a linguistic problem. This will constitute the prior research necessary to describe learners' misconceptions at the level of detail needed for adequate teaching program design. Chapter 3 will give an account of errors frequently made by learners of French, and describe and analyse tests and interviews set up to probe further into these learner errors.

### **3. INITIAL ANALYSIS AND PRELIMINARY STUDY:**

Grammatical gender is a persistent problem even for advanced learners of French, who even after seven years of tuition still make gender errors (Tucker, Lambert & Rigault, 1969; Buteau, 1970). The problem is not exclusive to French, as foreign learners of German seem to experience the same difficulties (Rogers, 1984, 1987). The load on the memory of the learner is enormous if we assume that the learners learn each gender individually. As pointed out by Rogers (1987:5), "even if the learner has mastered the logical complexity of the exponence of gender in German, he or she is still faced with considerable difficulties in the assignment of gender to particular nouns". Native speakers cannot make explicit the rules underlying their linguistic behaviour (Chomsky, 1965) whereas formal L2 learners often cannot apply the rules, even when given an explicit description of that rule (Corder, 1973:273). Such attempts have been made (Tucker et al, 1977), by identifying and testing a set of heuristic rules of French gender assignment. However it can also be argued that the majority of the common French nouns cannot be said to obey well-defined rules (Carroll, 1989). Yet the Francophone does not appear to have a problem in assigning gender to unknown words. Does he/she have to remember the gender of every single word, or does he/she devise a set of heuristic rules for assigning gender to unknown nouns? Once these rules have been investigated, it would be interesting to see if second language learners are also able to learn the gender of the words of the second language in a similar way, i.e inductively, by inferring the rules of the language presented to them without being shown or told the rules involved. Therefore, we shall give an overview of the problem of acquisition of the French gender system by native speakers of French and of English in (3.1.).

To determine the domain and scope of the problem facing English speaker learners of French, an initial error analysis was performed which led to the decision to concentrate on the acquisition of the concept of gender in French and the rules of gender agreement. The detailed error analysis which follows in (3.2.) shows that gender is closely linked to other features such as number in the nounphrase.

As part of this initial study, learners were also interviewed about their intuition concerning gender in French, as it was the only way to clarify some of the errors identified and to get an insight into the kind of rule system elaborated by the learners. These interviews and tests with young learners of French in the UK will be described in section (3.3.) and an analysis of the results presented and discussed.

### **3.1. Analysis of Gender Acquisition for Native Speakers of English:**

In this section, we shall explore the nature and extent of the gender acquisition problem for native speakers of English, by looking at the properties of the French gender assignment and agreement systems, then at the differences between the English and French gender systems, and then compare the way native speakers of French and native speakers of English learning French acquire that French gender system or not.

First of all, it is necessary to ascertain whether gender in French is paradigmatic, i.e. whether there are definite rules to the assignment of gender of nouns in French and if so what these rules are. This will be covered in 3.1.1.. Then we will try and find out why the French native speakers appear to have few problems in acquiring that system, even at an early age in 3.1.2. Finally, we shall look at the acquisition of gender in French for native speakers of English and at the possible reasons why it is such a difficult problem in 3.1.3.



### 3.1.1. The French gender system:

The gender system in French has a vital importance in comprehension and production of speech and written material. It underpins agreement with determiners and adjectives, and even past participle agreement, essential in the comprehension of noun phrases, and to a lesser extent in the verb phrase. It determines the use of pronouns, determiners and adjectives, etc. "Dans un texte l' accord en genre contribue de façon essentielle à sa textualité" (Weinrich,1989:1). All gender agreement depends on the gender of the noun.

Before we look at the phenomenon of agreement more closely, we have to determine the rules by which the gender feature, masculine or feminine gets assigned to the nouns of the French language by the native speakers of French. We have to describe the native speaker competence of the French gender system and establish if there are definite rules for the assignment of gender to nouns in French. For this, we shall consider the various types of rules invoked to assign the gender to French nouns, the morphological, phonological and semantic rules and their possible interaction.

Gender clues are provided by the determiners, pronouns, adjectives and relative pronouns governed by these nouns, whether definite, indefinite, demonstrative, possessive, interrogative. The gender distinction is also neutralised in the plural forms of most determiners, except for the interrogatives. It is often the only way to distinguish homographic and homophonic nouns.

The French formal gender system distinguishes two types of agreement, one for vowel initial words and one for consonant initial words, as there are usually different determiner agreement rules for these two types of nouns, with one set of determiners for the words starting with a vowel or a silent 'h' or 'vocalic' 'h' and another for the consonant initial nouns. These also affect the choice of determiners in front of preposed adjectives starting with a

vowel or vocalic 'h' (cet\_excellent homme, un grand\_enfant ) and leads to liaisons as in (l'\_ardent\_aigle, le gros\_hippopotame, etc).

Adjectives, whether appositive or predicative, agree with the noun which governs them. Appositive adjectives either come before or after the noun and are generally in its close proximity, whereas predicative adjectives are separated from their noun by a verb and can also be found at quite a distance from their governing noun, depending on the structure and complexity of the sentence:

*(Les yeux de la panthère noire qui court vers nous sont brillants).*

Some adjectives are invariable and do not carry any gender marking:

*(jeune, pauvre, formidable, fantastique, etc).*

Others are identical phonetically in their masculine and feminine forms:

*(seule / seul; chère / cher, noire / noir, etc).*

The rest can be divided into morphological categories:

- in the first, the feminine form is obtained by sounding the final consonant, which makes it advisable for the feminine form to be presented first, as the masculine can easily be obtained by truncation:

*(grande/grand; petite/petit) ;*

- in the second category, the gender marking is incorporated in the adjective, with the final vowel changing: These either contain a nasal vowel

*(bon/bonne, fin/fine),*

or have a different morphology according to their gender

*(neuf/neuve, vieux/vieille, menteur/menteuse,  
conservateur/conservatrice, enchanteur/enchanteresse)*

and therefore are more salient to the speaker/hearer.

Some grammarians and researchers argue that the rules of gender have a morphological basis, as many of the suffixes are associated with a particular grammatical gender, [words ending in /ation/ are feminine, whereas nouns ending in /ro/ and /sm/ are masculine (Arrivé et al,1986; Weinrich,1989; Carroll,1989). Others consider that French relies on its phonological system to assign gender (Desrochers,1986; Corbett,1991; Tucker et al,1977).

A detailed analysis of the phonological and morphological rules of the French gender system was carried out by Tucker et al (1969), in the form of a complete statistical analysis of 84.9% of the nouns listed in the Petit Larousse, each classified by their morphological derivations, i.e. suffixes or endings, and assigned a probability rating for the likely gender assignment. For example, the words ending with the suffix '-ation' are feminine; 99.8% of the words ending with final '-onne' are also feminine.

The predictions obtained were tested on novel nouns presented to native speakers and the results provided evidence that native speakers processed these from the end towards the beginning, searching for the most probable gender marker. Somehow, Tucker et al (1969:46) deduced that native speakers of French made their choices "through a process of inference based on experience with the language that has led to an accumulated store house of information about the regularities that are associated with gender".

Not all native speakers agree with the studies of Tucker et al. Phonic rules are usually less reliable than morphological rules, as some phonic endings do not provide any clues at all about gender, whereas morphological rules are not only more powerful, but apply to all complex nouns (SurrIDGE,1993:82 83). Moreover, many nouns formed by suffix also have ambiguous final phones in terms of gender, whereas morphological indicators provide more certainty in virtually all cases.

Corbett also argued that it was possible to make accurate predictions about the gender of words according to the final and preceding phones, for nouns not covered by semantic and morphological rules (Corbett, 1991:61). These findings led him to conclude that French had a system of phonological gender assignment rules, even if it allowed for more exceptions than other systems: there were also cases in which the semantic rules had to take precedence, over the phonological and morphological rules, i.e. nouns ending in [m] were predominantly masculine, but [fam/(femme)] and [pɔm/(pomme)] are feminine. It would also appear that deaf children who learn to speak French do not learn to assign gender to nouns (Tucker et al, 1977:59), which shows the importance of phonological clues. The controversy carries on.

Gender can also be semantically motivated, by natural biology, with nouns denoting male humans usually masculine and nouns denoting females, feminine. However, there often is a lack of coherence between the gender of a noun and the biological sex of the referent:

- the names for certain professions, for historical reasons, remain fixed in their masculine form:

***[" Notre professeur de mathématiques est une excellente pédagogue" ] ;***

- nouns denoting animals sometimes exhibit a morphological variation based on their biological sex as in:

***[ chien / chienne ; vache / taureau / bœuf ].***

This is not always the case, as there is often only one lexeme for the species as in:

***[" le zèbre, serpent, rossignol" vs " la fourmi, baleine, tortue " ].***

The correspondence between sex and grammatical gender has therefore a limited scope. For nouns denoting inanimates, there are few semantic grounds that operate to assign gender, except for those nouns belonging to well-defined semantic fields which also have

a definite gender: days of the week, months, seasons, cardinal points, musical notes, trees, cardinal numbers colours and chemical elements are all masculine and nouns denoting countries, rivers, fruit, sciences and cars, are all bar a few feminine.

However, there are sometimes conflicts between different cues. Nouns denoting humans take gender according to sex. The conflicts existing between these different rules and the number of exceptions point to the difficulty that even an adult native speaker would encounter in assigning gender to nouns. Fortunately, there are very few words where the semantic rule overrides a conflicting phonological clue. For non-humans, there is clear evidence of the operation of morphological and phonological assignment rules. Monosyllables are more likely to be masculine than not. 90% of words ending in -é are feminine.

According to Weinrich (1989), the gender of a noun is a lexical feature of that noun which can only be learnt as such. Carroll (1989:545) also argues that French gender is "an attribute of lexical categories, of units of the morphosyntax" and that "the clues for gender attribution for such words as [/pomœ/, (pomme)] are to be found in the syntactic context." (Carroll, 1989:548). "Gender attribution... requires extrapolation from a syntactic representation in which a noun occurs "

Gender clues can be provided by the linguistic context, as shown by the following examples from Carroll (1989:551-552), in which contrast two alternative lexical forms for the same word, both with different genders.

#### **MASCULINE**

*a) Un jour*

*b) le jour*

#### **FEMININE**

*une journée*

*la journée*

<i>c) les jours longs</i>	<i>les journées longues</i>
<i>d) les jours sont longs</i>	<i>les journées sont longues</i>
<i>e) tous les jours sont pareils</i>	<i>toutes les journées sont pareilles</i>
<i>f) les jours sont tous pareils</i>	<i>les journées sont toutes pareilles</i>
<i>g) la table, elle est plus là !</i>	<i>le livre, il est plus là !</i>
<i>h) elle est plus là, la table !</i>	<i>il est plus là, le livre.</i>
<i>i) les tables sont là. Elles sont sales.</i>	<i>les livres sont là. Ils sont sales.</i>

These examples also demonstrate a range of increasing complexity of the syntactic environment in which the nouns, their determiners and modifying adjectives can occur:

- 'a' and 'b' differentiate gender through the use of determiners (definite vs indefinite);
- 'c' differentiates through the form of the adjective, both phonologically and morphologically;
- 'd' involves predication and differentiates as in 'c';
- 'e' contains two determiners, including a variable quantifier, which is the only one differentiated;
- 'f' involves the floating of the same variable quantifier;
- 'g', involves left dislocation and differentiates both in the determiner and pronoun;
- 'h' involves right dislocation and differentiates as 'g';
- 'i' deals with an NP- pronoun antecedent relationship in the discourse and provides only one clue to gender, in the form of the pronoun.

This led Carroll to conclude that the clues for the gender of a noun can only occur in certain syntactic locations and that the native speaker needs an awareness of the syntactic

representation of the sentence to be able to perceive the gender clue provided by the linguistic context. According to Carroll (1989:552), the learner must:

- learn that certain modifiers are variable;
- learn that pronouns can change shape depending on their antecedent and be able to recognize the antecedent;
- hypothesize that 'un/une' and 'ce/cet/cette' are variations of the same lexeme/word;
- hypothesize the presence of gender agreement markers among modifying expressions.

Corbett (1991:143) also argues that agreement is the means by which gender is realized and later shows that in case of conflict, languages with formal assignment systems may have either a semantic, syntactic or mixed resolution, with French falling in the syntactic resolution category, thereby vindicating Carroll's theory.

So far, we have seen that the gender of nouns in French may be predicted from a range of competing morphological/phonological factors, that some semantic factors also interfere in gender attribution, and that the syntactic context and syntactic restrictions on the rules of gender agreement in French provide valuable clues which might help resolve these conflicts. This would have implications for the acquisition of the concept of gender in French for both native and English speaking learners, who need to have a syntactic representation of the sentence to acquire gender and gender agreement.

### **3.1.2. Acquisition of the French gender system by native speakers of French:**

According to Corbett (1991:70), native "speakers assign nouns to genders without difficulty simply by taking advantage of the regularities" present in the linguistic environment. gender assignment rules are part of the native speaker's competence. The

child acquiring a gender system must first recognize the patterns and the problem becomes one of learnability for such distributional systems. These are easily predictable in semantically based systems, whereas in more formal systems, morphological information is required. We have also established that the native speaker-hearer must make use of the syntactic clues provided by the linguistic environment in which the nouns, their determiners and adjectives occur.

So, how do young native speakers acquire the French gender system?

There is evidence that, even from the start, native speakers of French produce correct sequences of article + noun (Carroll,1989; Gregoire,1947; Sourdot,1977). Karmiloff Smith (1979), in her study of the acquisition of determiners with young French native speakers, shows that even the very young experience no difficulty in making consistent gender choices. Three year old children take advantage of the phonological clues, and before the age of 9, these clues tend to outweigh the semantic clues provided by the context provided, in the form of pictures.

Carroll (1989) favours the hypothesis that the gender feature is a feature of the noun class, universally available and triggered in the syntactic lexicon, once the nouns and articles have become differentiated in the lexicon. According to her, the determiners have a privileged role in the acquisition of gender attribution. Articles would appear initially as unanalyzed parts of nouns and therefore have no morphological status. Then, they disappear for a brief period (Sourdot,1977), which would lead to the hypothesis that they are being reanalyzed as distinct words (Carroll, 1989:570).

Once reanalyzed, these determiners become syntactic cues for gender, along with other agreeing elements and continue to be privileged cues for gender attribution. Local cues are good cues because they are available on line (i.e. within the noun phrase) and more distant



cues (in predicate sentences or other sentences) are not so good and not available. This distinction between good and bad cues is also rather similar to the concept of cue validity and cue-cost, described in MacWhinney's competition model (MacWhinney,1987). As children's ability to assign nouns to gender following the majority pattern improves with age, Mills (1986:109) argued that the order of acquisition of rules would depend on the principle of 'clarity', a clear rule being one with few or no exceptions covering a large number of items. French-speaking children would then "adopt a strategy (using the phonological rule), which will work most of the time, though, in the mature system, the semantic rule takes precedence"(Corbett,1991:88).

'As clues for the gender of a noun only occur in certain syntactic environments, Carroll argues that learning which gender feature to assign to a noun requires a knowledge of the deep structure of all the constituent elements of a noun phrase or a sentence. For example the noun is embedded within another constituent, an NP along with variable modifiers (determiners, adjectives, complements) itself embedded within a sentence and these variable modifiers can also be c-commanded across many boundaries (the noun phrase boundary in the case of predicative adjectives, or even sentence boundaries as in the case of pronouns, which may refer to the noun in another sentence).

(Carroll,1989:572) then predicts that "the correct use of determiners will precede the correct use of their gender-marked categories", a hypothesis verified by Fink (1985), which required children from 2.9 to 11.4 years of age to produce predicative adjectives and revealed that the youngest children treated adjectives as invariant. Furthermore, noun-object pronoun agreement would also occur later in the acquisition and children would tend to overgeneralize the use of the masculine pronouns in the earliest stages (Nuckle,1981).

This might explain why certain features of the French agreement system are difficult even for native speakers to acquire (i.e. direct object agreement) and only come very late in the language development of the child, as many other syntactic rules and features would have to be acquired as a prerequisite for correct gender agreement.

### **3.1.3. Acquisition of the French gender system by native speakers of English:**

Both the competition model and Carroll's UG theory would predict that acquisition of gender and gender agreement would be difficult for native speakers of English, as French and English are placed at two different ends of the spectrum in that respect.

We have seen in 1.1.4 that, according to MacWhinney (1989), regularities in English concentrate on word order, whereas in French, the emphasis is on morphological variations. Moreover, according to Corbett's classification of languages in terms of the criteria to assign gender, the two gender systems are also poles apart, as the minimal English gender system is based on semantic criteria, whereas the French gender system relies on a combination of morpho-phonological and syntactic clues, as demonstrated in our study of the French gender system.

Carroll (1989:573) bases her theory on the claim that gender is a universal property of the noun in the mental lexicon, triggered on line for native speakers of French. This would predict that second language learners learning a second language in which the grammatical definition of the noun class is similar to that of French would not have as many problems in acquiring the French gender system. In fact Spanish native learners have few problems in acquiring the French gender system (Giacobbe and Cammarota, 1986). Whereas for speakers, whose L1 has no grammatical gender system, (i.e. English native speakers), there would be two possible scenarios. In the first, this universal feature would remain available to second- language learners and though gender might be difficult to acquire, the native

system might be mastered. In the second, this universal gender feature would atrophy and disappear and preclude the native speakers of such languages (i.e. English) from acquiring near native competence of the French gender system.

Carroll thought that the latter might obtain, as immersion program children in Canada experience difficulties in article and other gender agreement marking, even after considerable exposure to the French gender system, making errors not found in the developing systems of native French speakers and persisting with these errors even in late acquisition (i.e. article + noun agreement and attributive adjective + noun within the NP) (Harley, 1979).

Taylor Browne (1984) also found that her subjects over-used masculine determiners and adjectives, irrespective of the number of hours of exposure, their cognitive maturity or onset of exposure, both in spontaneous production and in controlled experimental situations. These learners, whose conditions for acquisition of the French gender system come closer to that of the native speakers, not only do not achieve near native competence, but also appear not have rules of thumb for classes of words and not to make significant progress over time (Carroll, 1989:575).

This led Carroll to assume that the gender feature on the noun class therefore cannot be triggered, since English does not have morphological gender. Therefore, English native speakers learn the determiners as distinct syntactic words and apply their knowledge of the English expression of definiteness, indefiniteness and possession to the acquisition of such words as 'le/la', 'un /une', 'mon/ma'. They fail to develop the right representations of gender features on the nouns encoded in the lexicon. They would not necessarily have problems in understanding the concept of gender marking but neither would they have access to gender information in sentence production.

The only way round this problem is to develop mnemonic strategies, rules of thumb, similar to preference rules (Jackendoff, 1988) to pair nouns with all gender marked words. However, as no single rule of thumb is adequately descriptive, this would lead to overgeneralization at times. When the various rules of thumb would coincide, the learner would have no problem in marking gender. However, should these rules conflict, the learner would experience difficulties in making an appropriate categorization.

Carroll's model reminds us again of the competition model, in which the various rules conflict with each other, though it seems to be more detailed and explanatory. Carroll moreover argues that such theories are inadequate to account for the complex interaction among the different types of linguistic representations -phonological, morphological and syntactic- that characterize the native-speaker competence of the French gender assignment and agreement systems.

As most of the evidence used to support Carroll's theory has been drawn from data acquired from children in immersion programs in Canada, who usually learn French inductively, we may also need to investigate the data collected from second language learners in a more formal setting in a series of experiments to assess the validity of her theory.

We recall that a learner of French needed awareness of the syntactic relationships obtaining between the elements of the sentence to acquire gender efficiently. It would appear that the acquisition of the French gender system could be improved or speeded up if the consciousness of the learners was raised about the properties and relationships obtaining in the French gender system.

### 3.1.4. Contrastive Analysis of the French and English gender and agreement systems:

As background to the initial study, it was also felt useful to compare the French and English gender systems. As would be expected, this comparison revealed a lack of correspondence between the two gender and agreement systems, in terms of presence and government of determiners, order of syntactic constituents and scope of the rules of gender marking and agreement:

1. There is no gender indicator in English for the noun, whereas in French the gender is indicated by the determiner in the singular:

*(the table : la table, a table : une table).*

2. The choice of the determiner can be affected by the next word, if it happens to start with a vowel as in the case of the definite singular forms of the determiners and in the singular forms of the possessives:

*(l' autobus, l' adresse, l' école, etc);*

*(les pattes du lion/de la girafe/de l' éléphant/de l' antilope).*

3. Likewise, the determiner changes value for singular forms of the possessives followed by a noun or adjective starting with a vowel or a silent 'H'.

*(mon école, mon auto, mon amie, etc).*

4. There are different gender values in English and French: three possible gender values in English, according to the natural gender and/or animacy, whereas in French everything has to be either masculine or feminine:

*(the sun : le soleil, the moon : la lune,*

*the teacher: le professeur, the recruit: la recrue).*

5. The governor of the gender is different: in the case of possessives there is no agreement of the determiner in English with the head noun, whereas in French the determiner agrees with the head noun both in number and gender:

*(My father : mon père, My parents : mes parents).*

6. Moreover the governor of the gender is not the possessor as in English, but the head noun by which it is syntactically governed:

*(His car : sa voiture, Her father : son père).*

7. In French the adjective can come both before or after the head noun, whereas in English the only acceptable position is before the head noun:

*(A big man : Un homme grand, A great man : Un grand homme).*

8. The adjective agrees in number and gender with the same head noun in French:

*(A small man: Un petit homme, A small table: Une petite table,  
Small men: De petits hommes Small tables: De petites tables).*

9. In English, the head noun is always the last element in the nounphrase, whereas in French, its position is more variable:

*(A very tall man : Un homme très grand;*

*Les yeux de la girafe: the giraffe's eyes).*

10. The determiner is optional in the non-specific plural form in English, whereas it is compulsory in French

*(Cats : les chats).*

11. There is a difference in the generic vs specific marking in the two systems:

*(Men: Les hommes, The men : Les hommes, Some men : Des hommes).*

12. There is a difference in the scope of the co-ordination element :

*(The men and women : Les hommes et les femmes).*

Given the complex contrasts between the two languages, it is to be expected that the gender and gender agreement system for English learners of French will be a fruitful source of error. Possible sources of errors appear to be likely to belong to the realms of gender assignment, word order, finding the head noun, and the agreement of possessives and adjectives. As seen in 3.1.1., noun phrases are normally embedded in sentences of a varying degree of complexity, this is probably only the tip of the iceberg, as the problems might multiply if we consider sentence level differences relating to word order, case assignment, etc.

Therefore, before embarking on the design of a teaching program, further research on the acquisition of gender is called for. First of all, we started with an error analysis of GCSE exam scripts and moved later to a preliminary analysis, exploring some of the strategies used by young second language learners to determine and assign gender.

### **3.2. Initial Error Analysis study :**

We have seen in 1.3.2. that error analyses could provide a useful framework for research into the learners' interlanguage systems. Therefore, we decided that it could be useful to carry out such an analysis on errors occurring in a set of GCSE mock exam writing test scripts. We found that a lot of the errors made by the learners in gender and agreement rule system consisted of mis-applied rules. The procedure and the results of this error analysis are also available from Manning (1991 a & b).

These errors made by the students taking the test were identified, recorded, sorted and classified. The classification of errors was not always straightforward as some could belong to several categories. We had to determine whether some errors were syntactic or not and adopted the following criteria: Even a one letter error altering the morphology of the word would be considered a syntax mistake.

The errors found in the sample investigated were then grouped in terms of the number of rules or principles they infringed: single errors, those which violated one rule or principle, complex errors, those which violated more than one and ambiguous errors, those for which it was difficult to determine the exact rule or principle violated. The rules and principles violated by these errors are described at the beginning of each category concerned.

### 3.2.1. Single errors

Single errors violated one rule only: agreement in gender and/or number of the determiner and adjective with the head noun; vowel elision ; or preposition-determiner contraction.

The central rules of agreement in the noun phrase in French are the rule of agreement in gender and number of the determiner with the noun, followed by agreement of the adjective with the noun, whenever there is one. This can result in the failure in agreement of the determiner with the noun or of the adjective with the noun and mismatch of agreement between the determiner and the adjective. Examples of single errors follow below:

- a) Determiner-noun agreement errors are of two types, the first in which the masculine form of the determiner is used instead of the feminine

*(\*\* le moto instead of la moto,*

*\*\* mon famille instead of ma famille),*

and the second in which the feminine form is used instead of the masculine

*(\*\* la soleil for le soleil,\*\* la stade for le stade,etc).*

- b) Adjective-noun agreement errors involve those where, though there is evidence of the correct agreement between the noun and its determiner, the agreement of the noun with the adjective is either ignored or not applied

*\*\* une grand maison instead of une grande maison, etc).*



c) Instances of over-generalisation to compounds of the adjective agreement rule were also found, a domain to which that rule does not apply: here the first item of the compound being treated as an adjective,

(\*\* *ma grande mère* instead of *ma grand-mère*).

d) Vowel elision rules can interfere with the application of the gender agreement rules. These elision rules were either not known or not applied:

(\*\* *le autobus* instead of *l'autobus*).

Another example violates the vowel addition rule:

(\*\* *ma école* for *mon école*).

e) Errors also result, where the elision rule is applied correctly but an extra determiner, sometimes correct, sometimes not, is also inserted:

(\*\* *la l'autobus* for *l'autobus*, \*\* *ma l'école* for *mon école*, etc.).

There even appears to be some confusion between the domains of application of these two rules as the elision rule is applied instead of the addition rule:

(\*\* *m' école* for *mon école*).

At other times, the domain of application of the vowel elision rule is over extended to consonants:

(\*\* *à l piscine* instead of *à la piscine*,

\*\* *à l discothèque* instead of *à la discothèque*).

There were also instances of misapplication or ignorance of that rule

(\*\* *à le restaurant/ au restaurant*).

Examples of all these errors were common throughout the test papers.

### 3.2.2. Complex errors

Some other errors, which we will call 'Complex' errors, involved ignoring or violating two or three rules or principles, at the same time:

Sometimes two rules were involved: e.g.

- the determiner-noun gender agreement and number agreement rules:

*(\*\* un toilette instead of des toilettes);*

- the determiner-adjective-noun gender agreement and the adjective position rules:

*(\*\* le fenêtre grande instead of la grande fenêtre);*

- or again the determiner-noun gender agreement or the vowel insertion rules:

*(\*\* la l' autobus instead of l' autobus,*

*\*\* au apre midi instead of l' après-midi, etc.).*

In other cases there were even more than two principles violated:

- the determiner-noun agreement, the vowel elision rule and transfer of the English spelling:

*(\*\* le adresse instead of l' adresse);*

- the determiner-noun gender agreement, the vowel elision and the preposition determiner-contraction rules as in:

*(\*\* au école instead of à l' école).*

### 3.2.3. Ambiguous errors:

At times, it was difficult to determine the source of the error, as it could be derived from ignorance or misapplication of different rules. These errors were classified as ambiguous as when:

- the adjective agreement rule is applied correctly, but the determiner agreement rule is not, which calls into question whether the learner knows the gender of the word and has applied the adjective agreement rule correctly:

*(\*\* le dernière lettre for la dernière lettre,*

*\*\* le fenêtre grande for la grande fenêtre).*

- there is no determiner and no gender agreement, suggesting that the learner does not know the French gender agreement system or has ignored the compulsoriness of the determiner in French:

*(\*\* semaine passé for la semaine passée,*

*\*\* chambre moyen for une chambre moyenne).*

### 3.2.4. Evaluation of the initial study:

As seen in 1.3.2., error analysis can only provide a limited amount of insight on the learner's thought processes. If second language learners are to be seen as actively constructing a set of rules from the data they encounter and as adapting and revising these rules in the direction of the target language system, we can gain insight from the type of errors detected about the rules the learners are using. It might give us access to the underlying process of learning and the learners' strategies (Chanier et al, 1990).

In many cases, it was not possible to distinguish between errors of competence and errors of performance, without asking the user, who then had to be present and may not have been able to access these rules consciously (Els,1984). It was sometimes possible to

identify which of the rules had been ignored or misapplied. However, there were more complex cases which could give rise to several interpretations.

*(My pen: 'ma' stylo).*

could be interpreted as a gender mistake or a transfer of the rule of English possessive gender agreement to French. The only way to elucidate which category this error would belong to would be to ask the learner himself or herself, but this is not always possible.

A possible interpretation of some of these errors suggests that the learners misapply some of these rules as in the concept of 'malrules', explained in 2.2.2. Violations of rules can be found in learners' written French. Each particular rule can be misapplied in different ways and this leads the teacher or program to a series of possible courses of actions to be able to diagnose and remedy these errors.

- a) The learner does not know the rule at all, so it needs to be taught and practised.
- b) If the learner misapplies the rules, he/she has to be reminded of the rules and their conditions of application, possibly within the context of other rules and the misconception has to be corrected, then some of the examples practised.
- c) If the learner over-extends the application of the rule, then he/she has to be presented with instances of the cases in which this rule is restricted.

It will not always be easy to decide on the appropriate course of action.

This will cause many problems in the design of a teaching program, deciding which rule to teach first, how to teach that rule, how to combine it with the others, and how to make the program flexible enough to offer the adequate practice or remedial help. Learner interviews might help us to show how easily this internalised model can be made conscious and explore the learning process itself. More research is needed into the type of misconceptions that learners entertain about gender and gender agreement in French. For

this reason, it was felt necessary to interview learners to catalogue the possible misconceptions arising.

The initial error analysis performed was very useful in identifying the areas of syntax which appeared to give problems to the English speaking learners of French. This allowed me to choose gender attribution and agreement as a potentially fruitful area for which to devise a tutoring system or program. It has illustrated the fact that second language learners often make up their own rules while learning a language and has brought to light the problems inherent in formalising learner internal rule models. The analysis has also shown that it would be necessary, and possibly useful, to run a series of interviews with the learners in order to have a better grasp of these possible misconceptions, as well as to analyse the original data more extensively.

The process of formalisation and ordering of these rules for the design of suitable computer programs and tutoring systems, coupled with a deeper analysis of the data provided by the learners themselves, and an attempt to predict the order of difficulty or complexity for the learning of a particular rule or set of rules, should be invaluable in providing some additional insights.

### **3.3. The Preliminary study: Interviews with learners of French on their conception of the French gender system:**

After identifying a linguistic domain for the implementation of our prototype system, analysing some of the errors made by the students in a piece of free writing, it was thought it would be a good idea to interview and question the learners about the rule they had applied in assigning the gender of a noun.

#### **3.3.1. Background for the Preliminary Study:**

The preliminary study was designed first to discover and study the strategies used by learners to learn vocabulary and the gender of words and then to see how the learners inferred and used the rules involved in gender agreement. For this a set procedure was established:

- The learners were given two learning tasks, described in detail in the next section , one at the beginning of the session and another at the end to see if their performance improved after focusing on gender (tasks a and f).
- It was also assumed that to be able to infer the correct rules, learners needed to be able to find similarities and differences within patterns of occurrence of words. This led to the design of a pattern recognition test, administered in two parts (task b).
- Then two gender guessing tasks were devised (tasks c & d) to see if the learners developed rules for assigning gender or entertained misconceptions about the concept of grammatical gender. It was hoped to identify these misconceptions with a view to avoiding or remedying them in our program. As French children were discovered to use the linguistic context in developing their concept of grammatical gender and gender agreement (Karmiloff- Smith,1986), it was thought interesting to see if the second

language learners would also be able to use the clues available in the linguistic context. We also wanted to find out if some of the learners would be able to deduce the rules involving adjectival agreement from the set of examples provided to them in the second task. Two gender guessing tasks were planned, one with the words alone (task c), and the other with adjectives (task d).

- The last objective of the preliminary study was to ascertain whether the learners of basic French were capable of giving accurate grammaticality judgments (task e). These also provided a way to check the randomness of the previous answers and the consistency of the learners' systems.

Two different age groups were chosen and three schools were involved, all situated in the London Borough of Islington (a grant maintained boys school, a mixed comprehensive and a girls' comprehensive), providing a total of 30 subjects (17 boys and 13 girls). There were 18 first year secondary learners, aged between 11 and 12, who had just started learning French, and 12 third year learners with at least one year of French. 8 different native languages were also represented, making up a sample of English, Bengali, Cantonese, Greek, Nigerian, Spanish, Vietnamese and French subjects. The time available for tuition was variable: the boys in the boys' school had an estimated total of 196 hours possible in the first three years, the learners in the mixed comprehensive had an estimated 252 hours of tuition in the first three years of French but had suffered from a disrupted schooling as they did not have a teacher for most of their second year. There were similar problems in the girls' school and a similar amount of time for tuition. The interviews lasted approximately 45 minutes each. Detailed examples and extracts of the experimental data are provided in appendix B, as published in Manning (1992).

### 3.3.2. Description of the tasks and procedure:

#### Tasks a: Learning task:

In the initial learning task, the learners were given 6 words with their English translations to learn in 5 minutes, chosen randomly from a list:

<i>(le manteau = the coat,</i>	<i>le parapluie = the umbrella,</i>
<i>le collant = the tights,</i>	<i>le pantalon = the trousers,</i>
<i>le chapeau = the hat,</i>	<i>la robe = the dress,</i>
<i>la chemise = the shirt,</i>	<i>la jupe = the skirt,</i>
<i>la blouse = the overall,</i>	<i>la veste = the jacket,</i>
<i>l' anorak = the anorak,</i>	<i>l' imperméable = the raincoat).</i>

Careful attention was paid to balancing the genders of the words in the task, with at least one of the vowel words contained in the list. The learners' reactions were observed and recorded on cassettes. After being tested on these words in a different order, the subjects were asked to explain how they usually learned vocabulary at home, and particular attention was paid to the gender of words.

#### Task b: Pattern recognition task:

In the pattern recognition task, the learners were given 3 lists of words with pictures representing modes of transport, to see if they could spot the similarities between the words given.

The first list contained only masculine words:

*(le ballon, le bateau, le camion, le train, le vélo),*

the second consisted of feminine words

*(la mobylette, la moto, la voiture)*



and the third list of words starting with an "a"

*(l' aéroneur, l' avion, l' autobus).*

The lists were shown to them again in pairs to gauge their ability to spot the differences between the two lists. The difference test always included the third list so that at least an obvious spelling difference could be noted, as all the items on list C started with an 'a'. The lists are also shown in appendix B1b.

The next two tasks tested the ability to assign gender to a noun 'out of' and 'in' a linguistic context.

#### Task c: Context free gender guessing:

The first consisted in guessing the gender of words chosen randomly from the list of 16 items presented in isolation with matching pictures containing:

*(armoire, bureau, chaise, fenêtre, canapé, coussin, étagère, fauteuil, lampe, lit, ordinateur, oreiller, porte, table, tabouret, télévision) ,*

The learners were asked to say or guess whether ' le, la ' or ' l' ' came before each of the words and to explain their answers. Their responses were recorded by careful note-taking and taping. In the second task, the subjects were asked to tell or guess whether the phrases presented to them in opposite pairs, containing the same adjectives with two nouns of different gender, were preceded with 'le, la or l' '.

#### Task d: Context-dependent gender guessing:

We also hoped to find out whether the learners would spot or guess the right gender more easily in an appropriate linguistic context.

The contextualized list contained the following items::

*(petit lit/ petite table, grande armoire/ grand vélo,  
grosse voiture/ gros bateau).*

Task e: Grammaticality judgments:

To determine whether the rules they were mentioning were consistent, the learners were then asked if they could spot mistakes in some linguistic expressions and to give reasons for their judgment. All the items were presented to all learners one by one in the same order. It was very likely that these items had already been encountered previously somewhere in the test. Some were correct , but others contained one or more errors, as shown in the list below:

- *la moto*, which was correct,
- *la petit moto*, which contained a gender agreement error and should have had an 'e' at the end of "petite",
- *la petite bateau*, which had the wrong gender but a consistent agreement,
- *la vélo*, which had the wrong gender and an accent missing,
- *le grand voiture*, with again the wrong gender and the logically following agreement,
- *le grande télé*, with the wrong gender and an illogically following agreement,
- *le petit lit*, which was correct,
- *le aeroglisseur*, which had the wrong determiner and an accent missing.

Task f: final learning task

A second learning task, with different but equivalent items, chosen from the initial learning list, was given to all the learners, under the same conditions, to assess the influence of the

focus given to the questions and tasks on the results, i.e. whether they would be more successful at learning the gender of the nouns the second time around.

### **3.3.3. Results of the preliminary study:**

#### Results for initial learning task (a):

The results of the vocabulary learning tasks showed that some of the learners were disregarding the determiners when learning items of vocabulary, as they thought these did not matter. Learners were also more likely to get the gender of words wrong even if they remembered the items of vocabulary nearly correctly. Learners were also found to use a number of strategies, ranging from looking at the words with concentration, down and across, mouthing the words silently or audibly, spelling the words in their heads or aloud and writing the words down, sometimes with, sometimes without meanings and with, and without determiners. There were also some instances of self-testing and monitoring, as learners were witnessed to hide words, change the order of presentation of words or shuffle bits of paper around. Special routines were also observed or related, with one individual having his/her own mnemonic rule, matching the 'le and la' with the initial letter of the words and another imaging the words. Though more successful learners appeared to be using more sophisticated methods to learn their words and were more likely to physically or mentally manipulate the order of items in the list, there was no evidence of a correlation between the final learning scores and the use of any particular technique. Those who restructured the materials presented to them and self-tested achieved a slightly higher average score in the learning test, self monitoring possibly involving higher cognitive strategies. No particular emphasis was placed on the learning of the gender or determiners of words. On the whole, the learning scores were not a very good guide to the knowledge of the learners. The older subjects performed slightly better than the younger

ones, as could be expected. With grammatical gender, there was no improvement in the gender guessing scores out of context, whereas the contextualized task results showed some improvement with age and language learning experience. The older learners still found it as difficult to assign gender to unknown words, though they were perhaps more able to make use of the linguistic context. Results of the test are also presented in appendix B2a.

Results for pattern recognition tasks (b):

Generally speaking, most learners did not have any problem in identifying patterns of differences and similarities in lists of words and between lists. In the pattern recognition task, it was found that though all learners were able to spot some similarities and differences, most had to be prompted to look at the spelling of words, or directed more specifically to the beginning of words to notice the determiners. Most of the older learners did also spot the 'a' s at the beginning of words in the vowel list whereas a few of the younger learners missed them altogether. A significant number of learners focused on semantic features of the words rather than the spelling or morphology, which could become a barrier to gender learning and correct inference of rules. Examples of the learners' answers in the pattern recognition tests are to be found in appendix B2b.

The similarities found by the learners between the words in all lists, always included the desired outcome, noticing the presence of the same determiner, but also included a range of alternative considerations, either semantic, orthographic or phonological, as will be seen below.

For the masculine only list the reasons given and recorded were mainly semantic :

*("all transport, something to do with travel, had wheels;  
some went on air and some on water")*.

As far as the feminine list was concerned, the similarities spotted by the learners included both semantic (a) and orthographic (b) criteria:

- a) ["all had wheels again; a similar background, i.e., grass and fields; people rode on them; all had engines; and were all transport"].*
- b) ["'o' for the second letter; and all had a 't's" ].*

The similarities spotted in the vowel list involved again a focus on semantic (a) and/or orthographic criteria (b):

- a) ["pictures under the words; all depicted things with people in them; all 'vehicles'; were for getting people about; on land, sea and air; sky was visible in all the pictures" ].*
- b) [had 'a' at the beginning of each word; all had a speech thing, i.e. an apostrophe; all words were all the same" ].*

The differences between lists 1 & 2 could also be classified into semantic (a) and orthographic (b) criteria:

- a) ["In some of the means of transport, you could get wet and not in others; the air balloon was pumped in with air, only with air" ];*
- b) ["they began with different letters; they were all different words" ].*

In the lists 1 & 3 again, the differences spotted by the learners were either semantic a) or orthographic b):

- a) [ "Items in list 1 went on land, whereas items in list 3 on air or water; different kinds of power operated them; 'men' drove the items in list 1; some carrying goods, others people" ];*
- b) [the beginning words were different" ].*

Examples of answers in pattern recognition tests are also provided in appendix B2b, already published in Manning (1992).

The fact that the learners were not always perceiving the relevant factors or looking at the relevant features, will have to be taken into consideration in the design of our program and further experiments.

#### Results for gender guessing tasks (c & d):

In the gender guessing tasks, it was found that though all learners guessed, most were found to make up rules of gender attribution which led to misconceptions, involving either semantic criteria or less often morphological or phonological criteria. In the semantic misconceptions, some learners assumed that words for big, powerful, strong and mobile things were masculine, whereas words for small, soft, static things were feminine. Examples of such misconceptions, which included semantic, spelling and phonological considerations are then given below:

The semantic misconceptions ranged from:

***["big, strong, powerful or mobile objects used by men were masculine";***

***"Soft, small, static things or objects used by women were feminine";***

***" words for which one could not tell took 'l' ' "].***

The spelling misconceptions listed were :

***["masculine words had 'le' or 'el' in them; 'e' as their second letter;***

***a lot of vowels; no vowels at the end or ended in "e";***

***whereas feminine words had no 'l's; no 'e's; 'a' as a second letter;***

***'a's in them; or ended in 'e' "; and "l' " words ended with "l" ].***

As for the phonetic misconceptions, encountered in only one learner, we found :

*["strong sounding words were masculine whereas  
soft sounding words were feminine "].*

Some of the older learners were more able to guess the gender of words in the gender guessing task in context. This showed that they were probably more aware of the importance of grammatical clues within the word phrase and more consistently applied the rules they had worked out for themselves. Only half of the younger learners had misconceptions and made their own rules, they relied much more on guessing than the older ones, who, surprisingly, had a higher percentage of misconceptions.

It is also conceivable that the adjectives used, 'petit' and 'grand', might have influenced the kind of hypotheses the learners made about gender agreement, to judge by the number of semantic misconceptions. Examples of interviews identifying these misconceptions are to be found in appendixes B2c and B2d.

#### Results of the grammaticality judgment task (e):

The grammaticality judgment task was quite difficult, and many of the learners performed very poorly on this task, as was to be expected. However, there were several learners capable of identifying some of the mistakes and correcting them accurately or logically. Some spotted conflicting gender between nouns and adjectives more easily and exhibited a degree of consistency within their own rule system for French gender.

The percentages of correct application of the vowel elision rule gender agreement rules are presented in appendix B4, with the first figure representing the average for the younger group, and the second, the average for the older children. With rule application, there was no evidence that spotting the right element helped to infer the rule.

Most of the first years spotted the initial 'a' s, but none formulated any rule and only two managed to apply the rule, with one also spotting the error in the grammaticality judgment task. Most of the third years spotted both features, half formulated the rule, either remembering or inferring it, half applied the vowel rule correctly and a third the gender agreement rule. Some were able to apply the vowel rule, but unable to state it, and a few spotted the mistake; about half of those who applied the gender agreement rule were also able to recognise the same type of errors. The most difficult task was spotting the mistakes. Those who applied the rules had generally a higher average learning score than others (10% more), otherwise no other significant differences were noted.

Though the learner's rule systems were not stable, often there was a high degree of consistency in the way they applied or misapplied rules. It seemed that learners who entertained strongly ingrained misconceptions found it difficult to spot the evidence disconfirming their wrong hypothesis. The problem was also widespread as even learners who appeared to have mastered most of the rules still entertained misconceptions.

Some learners had a very good memory and could remember what the teacher had told them, though not always accurately, as they formulated the wrong rule or gave the wrong answer. The rules had been mentioned and demonstrated to most of the older learners, and some recalled them after a few examples. Perhaps not enough practice and consolidation exercises had been done on that topic.

### **3.4. Conclusions:**

The analysis of the French gender and agreement system at the beginning of this chapter gave foreboding of the fact that the acquisition of this system by native speakers of English might be a complex task. We have seen that awareness of the deep structure of the language to be learnt is highly desirable if not necessary for the successful acquisition



of the French gender system. Therefore it would be doing a disservice to the second-language learner to ignore the problems encountered in the acquisition of the French gender system. These were explored in two preliminary studies.

The findings from both the initial written tests and the preliminary study identified the key difficulties that learners have in the application of the French gender system, i.e. ignoring or misapplying the determiner-noun agreement, adjective-noun agreement; vowel elision and preposition-determiner contraction rules, and in combining the above rules.

It also showed that the children usually tried to find general patterns in the grouping of the words they were presented with and used hypothesis testing. However, many appeared to go off on the wrong track if left to their own devices. The wrong features, orthographic or phonological, and semantic were also found to trigger the gender rules inappropriately. We observed that many learners were unable to infer the correct rules from examples. Learners appeared to place a different focus on certain features, some appeared to concentrate more on meaning and others on form. This is not evidence that inductive teaching cannot work, as some learners seem to arrive at the right conclusions more quickly than others. It may just be that the great majority of the learners could benefit from some form of explicit teaching of grammar rules. However, this would not necessarily guarantee success as some of the learners who had already practiced and seen the rules could not remember them.

According to Surridge (1993:92), "native speakers are highly intolerant of gender errors made by children", whereas non native teachers of French are more tolerant, in the name of communicative competence. However, "gender mastery is a central component of the native speaker communicative competence in French".

All these findings need to be addressed if the teaching of gender is to be effective. Misconceptions will have to be identified and corrected by the teacher, or the learners could be persisting on the wrong path for a considerable amount of time. This challenging of the learners' misconceptions might be achieved by providing them with contradictory evidence or giving them feedback and advice on the errors spotted. One of the remedial problems however appears to be how much negative reinforcement or questioning is necessary to dispel these misconceptions.

Therefore, it makes sense to devise a program in which learners can progress, practice at their own rates and be guided on the right path. The learners may have to be directed, guided by attention seeking devices to concentrate on the appropriate feature triggering the rule involved. It is therefore proposed to design a program to teach French gender with multiple strategies, so that the appropriateness of each strategy can be experimentally tested in an educational context.

#### **4. PROGRAM DESIGN AND RATIONALE:**

In the preliminary school study, we identified some of the misconceptions entertained by some of the learners, and described some of their learning strategies in the field of vocabulary and gender acquisition. It showed once again that learners appear to formulate their own rules, not necessarily consistent with the target rules, though they achieve some degree of consistency within their 'interlanguage'. Further, some doubt emerged on the possible effectiveness of implicit teaching as the sole method to teach the grammar of a second language, as some of the learners did not discover the rules involved and concentrated on the wrong triggering features for the rules .

Several interesting questions however remain relating to the benefits of implicit teaching:

- 1) Can implicit teaching work or does it work for some individuals only ?
- 2) How does it fare in comparison with explicit teaching of the grammar rules, as used in the grammar translation or audio-lingual methods ? Does it work better? More slowly ? Does it lead to more misconceptions?
- 3) How would the more traditional implicit and explicit approaches compare with the more flexible exploratory approach, often recommended as the panacea for all tuition problems?
- 4) Would the 'better' learners, those possessing a greater variety of learning skills, possibly already doing well with implicit teaching, find it more attractive and stimulating than the other two approaches? How would the learners who had not benefited from implicit teaching cope with this new style of learning, how much guidance would they need in using that mode of the system?
- 5) Which of the three methods do learners prefer?

Another line of investigation concerns the learners' own linguistic systems and the rules they deduce from the linguistic material to which they are exposed (their interlanguage), as exemplified by the results of the error analysis and of the preliminary study. This Chapter describes how these issues are to be investigated via the design and testing of a program for teaching aspects of gender and agreement in French.

#### **4.1. Program Rationale**

The gender teaching program was designed to provide some answers to these questions. For this to be possible, a number of design features were necessary:

- a ) The program must include identical pre and post tests to allow us to gauge whether the learners had improved their scores and knowledge of the French grammatical gender system after doing the exercises. By comparing the results and answers of the students in these two tests, we would be able to test the knowledge of the gender of the words used in the testing, and the knowledge of each of the grammar rules to be taught. This would also provide a measure of the success of the program in each of the three modes under investigation.
- b) The recorded answers of the learners can also be used to investigate the consistency or inconsistencies arising in the learner systems at the time of each of the tests, possibly allowing us to obtain a synchronic learner profile for the acquisition of that particular rule. The learners can also be interviewed to see if they are able to state or explain the rules or the principles used when giving their answers after the pre-test. These can then be retested and answers reanalyzed after the post-test.
- c ) It was thought that the sequence of actions and reactions, especially in the exploratory mode would need careful observation, recording and monitoring. It was planned to use the computer to record the learners' answers in the tests, while

the experimenter would take notes on observations made during each session. A tape recorder would also be used to record each of the sessions, to provide a back up to the computer records of the tests and to allow the experimenter to check the validity of the observations. Besides the answers of the learners, the sequence of the practices would also be noted manually by the experimenter.

d ) Particular attention had to be paid to introducing adequately the options open to the learners in this part of the program and checking whether they would take full advantage of the choices then offered. It was also planned to question and interview some of the students about their perceptions and problems, to mirror the interviews of the preliminary analysis.

In the early stages of the testing of the program, the experimenter paid special attention to any problems arising from the design of the program, such as lack of explicitness of the instructions or of the explanations. This is why the pilot version of the program was tried out on at least 5 subjects to make sure that the experimental study was not fraught with too many problems. Then, after the initial problems had been corrected, the program was tested on approximately 30 subjects.

From the results obtained in the testing of the experimental program, it was hoped to gain a better understanding of learners' systems in the acquisition of the concept of gender, to test out the efficiency and appropriateness of three or more different teaching strategies, to establish possible links with learning styles, to gather valuable data for second language acquisition and to draw out the implications for theories of second language acquisition and the teaching of second and subsequent languages.

#### **4.2. Program Description:**

The program has been designed to compare 3 different teaching strategies: 'implicit', 'explicit' and 'exploratory', each implemented as a separate module. Each module contains a similar set of sub-components, a pre and a post test, identical in content, followed by a 'practice', a series of exercises on the rule to be taught or discovered, and chaining, as appropriate to modules containing the examples, explanations, practice exercises and revision.

In Chapter 3, we identified gender assignment and agreement in French as a linguistic domain for the implementation of the prototype program and discovered that native speakers of English had problems with the determiner noun agreement rules, vowel elision rules, preposition-determiner contraction rules and adjective-noun agreement rules, amongst others. These rules were therefore chosen to implement our system and we decided to concentrate more specifically on the rules of elision, contraction and adjective agreement, to complement and test the validity of the previous results, using a different vocabulary domain, that of animals and their physical properties.

The testing sessions also followed roughly the format of the original preliminary interviews, allowing us to observe the learners giving the gender of the words presented, giving reasons for these answers, checking determiner use and preposition contraction use, checking application of the adjective agreement rule.

The answers of the pre and post tests were recorded on individual student record cards and global group cards to allow for comparisons, analysis and computations. Detailed notes were taken of each session, to record any program malfunction or errors, and to gather manually other interesting observational data, not recordable by the computer, e.g. student's moods, facial expressions, comments, queries and reactions. Every session was

also to be audio recorded, to provide an extra set of student data, and to act as a back up for the observational data.

Animals had been selected to implement the program, so that the topic matter would be interesting and unfamiliar for these pupils, and also because, as animals can easily and naturally be described in terms of their physical features, this semantic field provided a reasonable framework for the natural application of the rules we wanted to investigate. The animals were presented in the indefinite form with 'un, une' or 'des' as appropriate, with line drawing pictures (see fig 4.1).

The line drawings from the animals finally chosen were taken mostly from plates photocopied from the Oxford Duden (Pictorial French and English dictionary, 1983), scanned into the computer and later transferred on to the relevant cards of the program. Others came from various Macintosh public domain picture libraries. If the program were to be commercialised, publication rights would have to be paid.

The syntactic structures used for the description of the physical attributes of the animals were to be:

*Voici un/une (ADJECTIVE) (ANIMAL).*

*Voici la tête d... (ANIMAL).*

*Le/ la/ l'/les ... (ANIMAL) a un(e)/des (ADJECTIVE)(e) (PART).*

*Le/la/l' /Les (PART) du/de la/de l' (ANIMAL) est/sont (ADJECTIVE).*

which could then be used and re used in all the parts of the program, as appropriate, the first two being used as prompt sentences.

Several types of exercises were considered, ranging from browsing through individual vocabulary cards, moving small icons representing the words into the appropriate column/s, clicking on a picture to make the appropriate determiner appear, choosing the

appropriate determiner from a closed list, typing in the appropriate determiner, finding gender and other mistakes and hearing the words and their determiners pronounced. After careful consideration and consultation with other experimenters, it was decided to limit ourselves to a number of exercises: browsing, multiple choice and type in questions, as these offered appropriate exercises for the topic and the research question.

These exercises still followed the general principles for good language teaching practice laid down by the recommendations of the English National Curriculum (see section 2.1.7.), which were as much as possible to use visual and aural stimuli, let the learners directly manipulate the interface with a mouse, present them with plenty of opportunities for practice, and give them choice and autonomy in their learning.

#### **4.2.1. The implementation of the Program**

As the experimental study was to be carried out in three parts, to investigate the learning and acquisition of three rules of the French Gender system, elision, contraction and adjective agreement, the program was designed as a set of three modules with an identical structure, each implemented in each of the three teaching strategies under scrutiny, implicit, explicit and exploratory.

The elision module was first designed as a template for the whole program, tested thoroughly, debugged and modified when necessary, before the other modules were conceived and designed. The other two modules differ mainly in the content of the text and exercises, with slight modifications, as found to be necessary or appropriate. These will be explained in greater detail in section 4.3.3. and 4.3.5.



The program is implemented in Hypercard, an object oriented-language, custom designed for Apple Macintosh, which consists of sets of stacks containing a number of cards, each with different objects attached, i.e. fields which store information, text or data, and buttons which send up messages to the processor to execute certain actions or process the information or data contained in the fields. It was thought best to illustrate its operation by providing a detailed description of the elision module and giving examples of interaction.

For each of the rules to be investigated, a module was designed using the elision module as a template. All three modules are virtually identical in their structure. Each module is made up of sub modules, using the facilities offered by Hypercard. Each is arranged in stacks: one or two test stacks, a record stack, an example stack, an explanation stack, several practice stacks and a revision stack. The test stacks, contain the questions used in the pre and post tests. The record stacks are used to record the answers given by the learners in each of the tests. The explanation stacks contain several cards explaining the rules of grammar to be learnt and the matching example stacks the corresponding examples illustrating the application of these rules. The practices, designed so that the learners can either discover or apply the rules are also linked directly to the examples and if appropriate to the explanations. Finally, the revision stacks, give an overview of the items covered in the practices. The content of each of the modules differs only to the extent that each module deals with a different rule or set of rules, and calls for different exercises, whose content will be detailed in 4.3., but all three modules operate in the same way and on the same principles.

In all sections of the program, the functionality was designed to be as generative as possible (e.g. generating examples from a data set ) and as extensive as possible (e.g. allowing data sets to be extended if desired ). To design the subsequent modules,

contraction and agreement, the stacks were copied and the only alterations to be made were relatively easy and ranged from changing the content of the fields, renaming and sometimes adding or retrieving buttons, to changing and copying pictures and re-ordering cards. It was not possible to just use the elision module as a perfect template, as it was desirable at times to add new vocabulary items, new pictures, not necessarily of a standard size, more buttons and even to quickly redesign the lay out of some of the cards. The main common links were the general format of the cards and stacks, the way the stacks were interlinked and connected to each other, and all that was needed was to change the names and make the necessary alterations on the appropriate buttons.

This means that a programmer used to Hypercard programming can easily add and alter the stacks and use the same template to design other cards dealing with other rules. However, such a programmer would have to first study the structure of the program and become familiar with the existing links. The program was not designed as an authoring program, capable of generating other grammar programs of the same type and structure. Some errors and inconsistencies can easily be spotted by an experienced programmer, i.e. some stacks have slightly different backgrounds, locations of buttons, and cards within a stack may also have slight modifications in their lay out, and be copied from one, two or three different other stacks. However, the links and the content of the program were checked over and over again and used by the learners and it was hoped there would not be any major errors left in the program. A complimentary copy of each module was left in one of the schools and I understand that the children are using the program without too many problems and are enjoying it. Further, this program was not intended to be commercialised in the near future, as its main role was to facilitate a partly computerised second language acquisition experiment and to help the collection of data to extract desirable CALL design principles and assess teaching strategies for such programs.

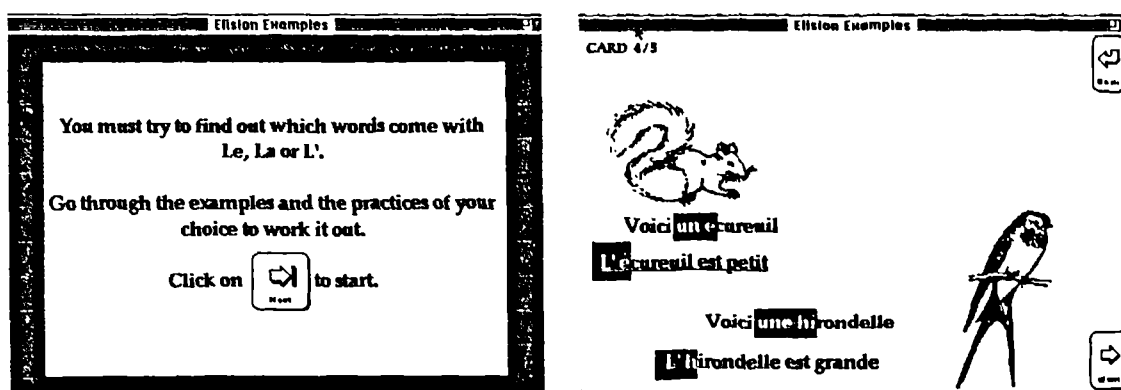
In the next section, we shall give a general overview of the common general design principles on which the whole of the program was conceived, concentrating on the modes in which it operates, before giving a detailed description of all the component parts of the modules and their interaction in each of the three modes, using the elision module as an example.

#### **4.2.2. The Program Modes**

All the three modules can operate in all the three modes, designed to model possible teaching situations. Two of them are didactic, the implicit and explicit modes, as they impose a sequence to be followed in the practice. The third mode, the exploratory mode, aims to give more autonomy and freedom of choice to the learner, by not imposing any order on the possible interaction. It was felt necessary however, to set up a default path in the exploratory mode, to implicitly guide the learners in their future course of action.

The basic distinctive features characterising each of the modes are the order of presentation of the material in the practices and the access to and availability of some of the program features for that practice.

In the implicit mode, the learner is set the task of discovering the rule involved for that module and of following a series of practices and examples. To complete it, he/she must follow a preset path, structured to facilitate the learning: first the learner sees an example card before each exercise, then he/she goes through the exercise, trying to work out the rule or principle involved, with immediate feedback to confirm or disconfirm his /her hunches. The learner can always refer back to the example, by clicking on the [example] icon and return to the last card visited by clicking on the [back] button.



*Figure 4.1. The practice sequence for the 'Implicit' mode to teach elision.*

To further assist with the process of analysis, inference and generalisation, a revision or global card is also shown at the end of the exercise, recapitulating all the examples encountered, before he/she moves on to the next stage of the practice. Further revision is also possible by allowing the learner to return to any of the examples or exercises and giving him/her access to the global revision cards, common to all modes.

This process is then repeated until all the exercises have been completed (a pair for each sub-rule), unless the learner has chosen the available option to by pass or abort that particular exercise, by clicking on the [Stop] button, which immediately leads him/her to the end of that exercise. It was felt necessary to provide a permanent option to exit the exercise to cater both for learners who already knew the rule and therefore might become bored, and for those who might find the exercise too frustrating or difficult and need to abort it immediately.

The explicit mode contrasts with the implicit mode as follows. The rule of grammar applying to the examples and the exercises is presented first to the learner, who is then shown the matching examples and led on to the appropriate exercise, with the task of applying the rule correctly and learning it. This practice also involves the same exercises, presented in the same order as in the implicit mode, with the same amount and quality of

feedback. Again, there is always the possibility to go back to the rule or the example and to return to the place in the exercise, as well as that of exiting the exercise altogether. The cycle again finishes when all the exercises have been completed or avoided. However, there is no revision card at the end of each set of exercises, so that the learners operating in that mode are not given an unfair advantage over those working in the implicit mode. However, the learner can still see the global revision cards that are common to all modes after he/she has completed all the exercises, if he/she so chooses.

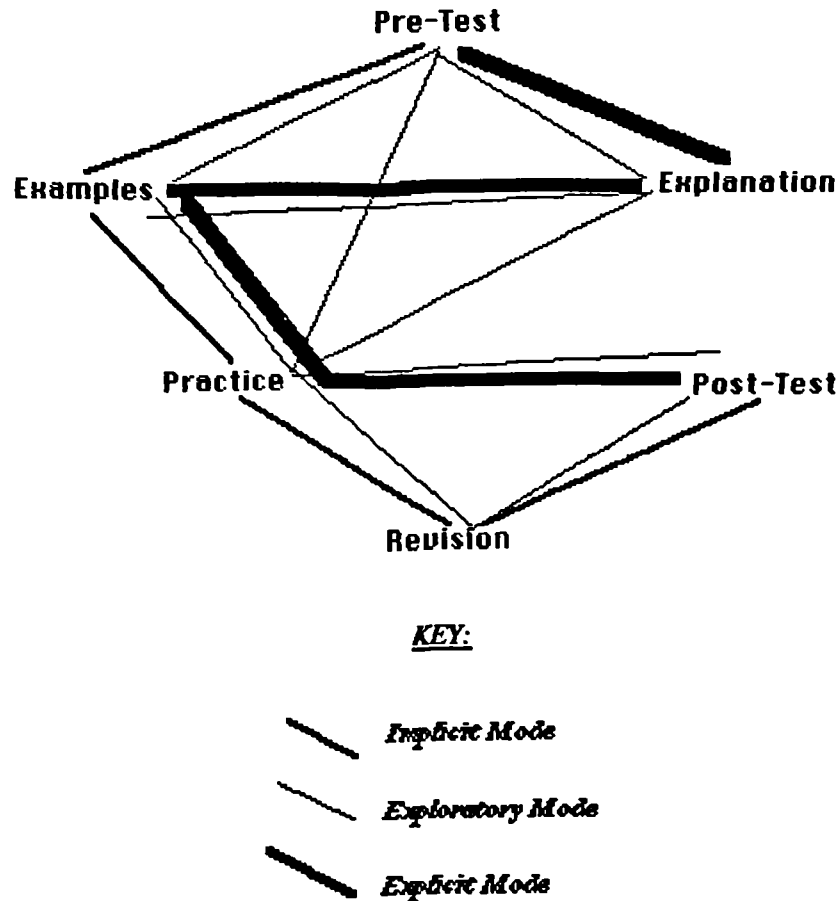
In the exploratory mode, the learner is offered the option to explore either the set of examples, the set of explanations or to start immediately on the practices. All components are interlinked, so that all the way through the exercises, he/she can see or refer back to the matching example or explanation, with access to the question he/she was answering by clicking on a [BACK] button (which automatically returns the user to the previous card visited). Therefore, the learners can switch back and forth through the set of examples, practices and explanations according to their needs and inclination.

The paths to be followed in each of the interactions are laid out in fig 4.2., graphically representing each of these possible paths and the relationships between each of the parts of the program, i.e.

examples practice-revision for the implicit mode (represented by the medium thick line),

explanation-example practice for the explicit mode (represented by the thick line)  
and

constrained free choice in the exploratory mode (represented by the thin lines).



*figure 4.2. "DIFFERENT PATHS taken through the various parts of the program in the three modes.*

The common parts to all three modes are the examples and the practices, though some of the facilities provided by the program are only optional. In the next section, these common and module-specific parts shall be described and explicated. It is also suggested that the reader refer to this diagram to keep an overview of the relationship between all the component parts.

#### 4.2.3. The program components

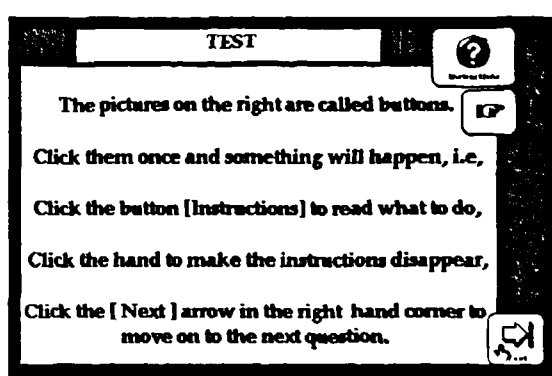
All the three modules contain similar components, one or two test stacks, a record, an explanation, an example, a revision stack, and a series of practice stacks. These will now

be described in detail and illustrated with examples of the different procedures followed by a hypothetical learner in each of the modes, to clarify the overall program design.

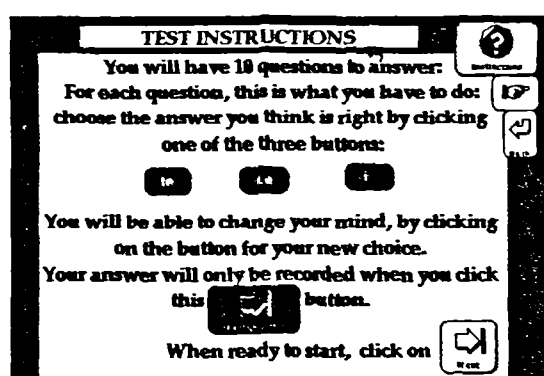
a) The Test stacks:

The test stacks have been designed to assess the learners' initial state of knowledge of the point of grammar to be practised and to enable us to compare this initial state to his/her performance after completing the practice. In both the pre and post tests, the questions are identical, and appear, in the case of the elision module, in the same order, and in a different random order in the other two, so that the order of presentation ceases to be a possible influence on the performance of the learners. Each of the test stacks has 13 cards, an initial card, an instruction card, an information request card, 10 question cards and a final card. An example of each of the types of cards is provided for the elision module, in the following diagrams, Figures 4.3. a,b,c,d,e.

The initial card is designed to familiarise the learners with the computer and the role of the buttons. It has a field containing the information detailing the role of the buttons and three buttons, which can be used to practise clicking, an [instruction] button to click to make the instructions appear, a [hand] icon to get rid of the instructions and a [next] Button , which leads on to the test instruction card.



*fig. 4.3.a. Initial Test Card*

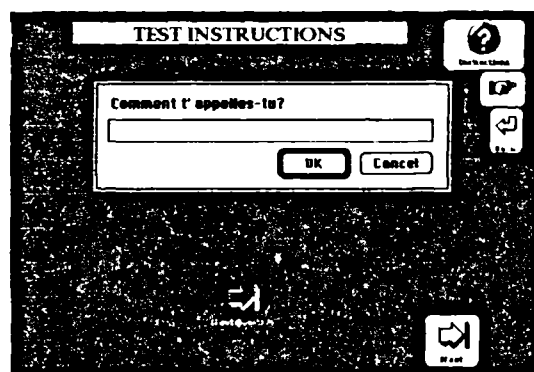


*fig. 4.3.b. Instruction Card*

The instruction card explains the procedure to be followed during the test and asks the learner for personal information to be recorded on his/her record card for the exercise when the card is exited. The program features for this card include a field containing the instructions about the procedure to be followed during the tests, the same [instructions] button, [hand] icon as on the first card and the same [next] button, which, when clicked, asks the learner the three following questions in French:

- 1) Comment t'appelles tu?,
- 2) Quel âge as tu?,
- 3) Comment s'appelle ton école?.

These questions appear in a dialogue box, in which he/she also has to enter the relevant information about the number of times the test has been taken, his/her name, his/her age and his/her school, an example of which is shown in fig 4.3.c.:

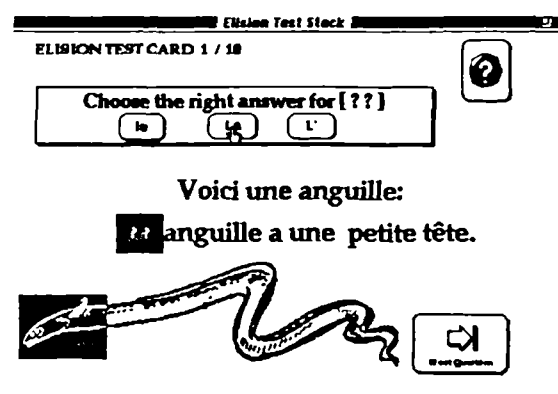


*fig. 4.3.c. Student Information Request*

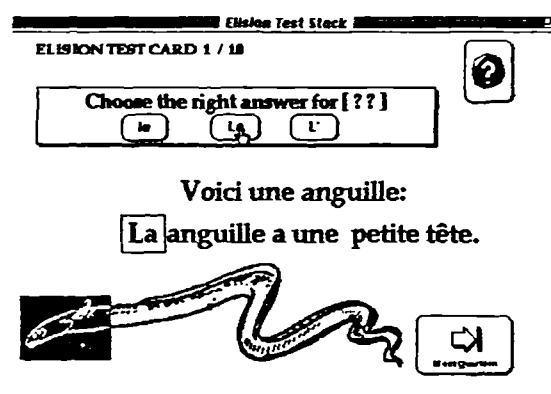
A test record card is then automatically created by the program for each learner, and the information provided entered and recorded. An example of such a card is available in 4.4.b. From each of the question cards, it is always possible to return to the instruction cards, by clicking on the [instructions] button.



The 10 question cards are identical in lay-out and differ only in respect of the content of the questions and of the picture scanned, with the part of the body focused on in the question highlighted, to facilitate comprehension of the statement and description. There are also several information fields, a field giving the prompt sentence for each question and a question field and several buttons, two or three in the prompt field, representing the choices offered to the learners. These may be clicked any number of times to try out the possible answers, and an answer field, with a [??] button, which is replaced by the answer selected. When the learner is satisfied with his/her answer, he/she then must click on the [next question] button, which sets off a routine of the program designed to record the answer given on to his/her record card, shuts off the current question card and opens the next one automatically. This process is repeated for all the 10 questions as follows.



*fig. 4.3.d. First Question Card*

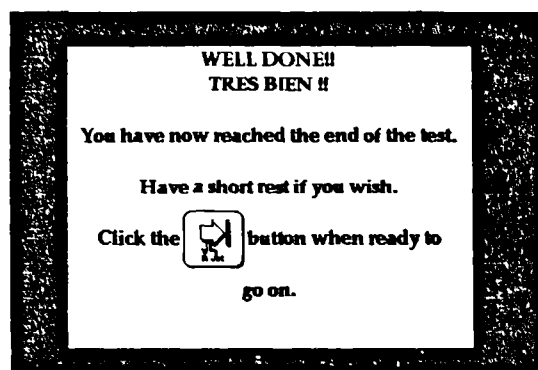


*fig. 4.3.e. Question Card with Answer.*

The other questions, presented to the learner in the same order both in the pre and post tests are shown in appendix C1.

The last question card is followed by the final test card, which contains a field announcing the end of the current test and a [next] button, asking the learner if he/she wishes to see his/her answers. If the answer is positive, then the learner is presented with his/her record card, which gives him/her the score for the preceding test and the prompt words. The

learners were not told the right answers, as it was thought it might interfere with the running of the experiment.



*fig. 4.3.e. Final Test Card*

#### b) The Record Stack:

This stack consists of a set of cards, one card per learner, which contains information about the learner, i.e. name, age and school and records the answers given in all the tests taken, i.e. the pre and post tests for that particular rule and the mode chosen for the ensuing practice.

Records

Elision Record Card

Explanatory 2.37 min

georgina  
rose  
13  
EGA  
12/5/92

2

Le	L	impelle	
La	La	chasson	
La	La	cochon	
La	La	écrouill	
La	La	stèle	
La	La	zéroville	
La	La	blouson	
La	La	lim	
La	La	oups	
La	La	stage	
2	10		

*fig 4.4. Filled Record Card*

After looking at the record card, the learner can then proceed to the next stage, the practice, by clicking on the [next] button, which leads him/her on to the mode instruction card.

### c) The Mode Cards:

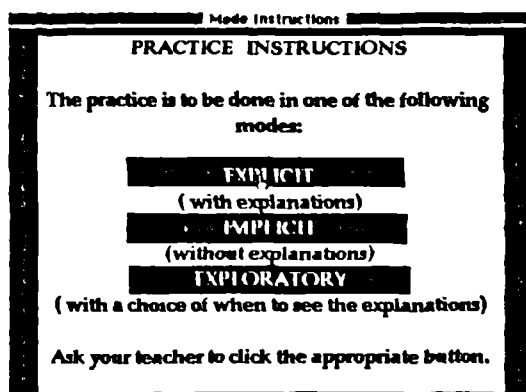
These were designed to select the appropriate mode and to explain to the learners their task and assignment during the practice. In the experiment, it is the experimenter who chooses the mode in which the practice is to be experienced, i.e.

- implicit (without any explanations),
- explicit (with explanations) or
- exploratory (with a choice of whether and when to consult the explanations).

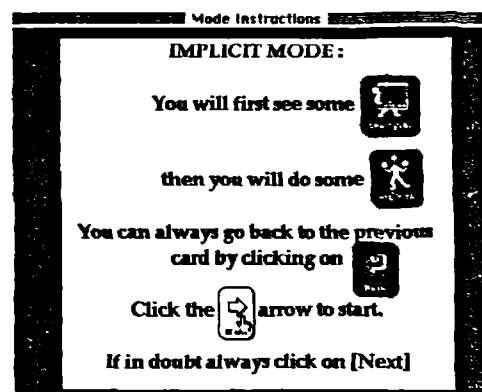
on the 'introductory card', (fig 4.5.a) by clicking on the appropriate button. In self-access and autonomous learning, the learners could make their own selections.

The learner is then presented with the instructions card matching the mode selected. with the assignment to fulfil: 'guess the rules' in the implicit mode (fig 4.5.b), 'apply the rules' in the explicit mode (fig 4.5.c) or 'find out about the rules' in the exploratory mode Fig (4.5.c.).

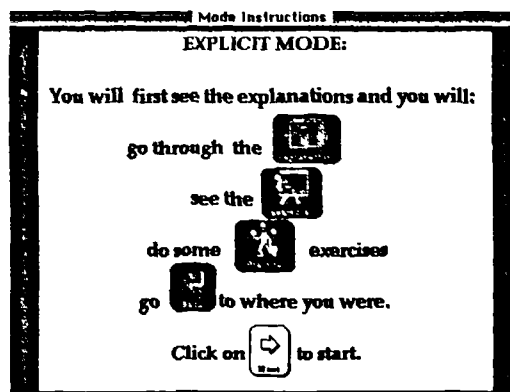
***Fig 4.5. MODE INSTRUCTION CARDS***



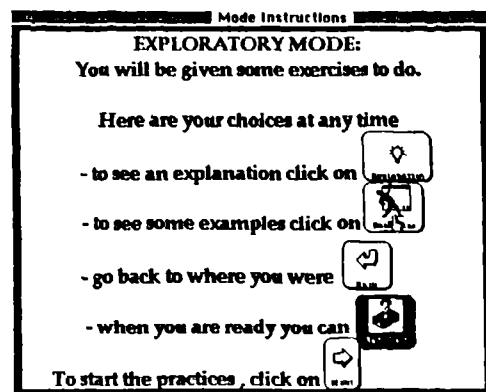
***fig 4.5.a. Mode Choice Card***



***fig 4.5.b. Implicit Instructions***



*fig 4.5.c. Explicit Instructions*



*fig 4.5.d. Exploratory Instructions*

On exiting the mode instruction cards, the learner is then presented with the next card in the procedure (see mode definitions), the example card for the implicit mode, the explanation card for the explicit mode and a menu from which to choose the next step in the exploratory mode.

#### d) The Example Stacks:

Once the practice starts, the first example card is the first card visited by the learner who has chosen or been assigned to the implicit mode and the second card seen, preceded by the appropriate explanation card, in the explicit mode. After examining it, the learner then moves on to the matching practice, to which it is automatically linked by the click of the [next] button.

In the implicit mode, there is no local [explanation] button, as the learners are supposed to guess the rules that are being applied, whereas in the other two modes, explicit and exploratory, the learner can click on the [explanation] button and a field appears containing the appropriate local explanation to explain the examples on the cards.

The following cards show examples of instructions (fig 4.6.a.), the menu for the practice (fig 4.6.b.), an example with and without local explanation (fig 4.6.c & d), another example (fig 4.6.e) and the final example card for the elision module (fig 4.6.f):

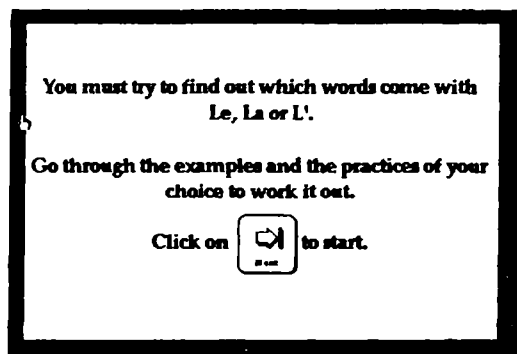


fig 4.6.a. Initial Card (Implicit Mode)

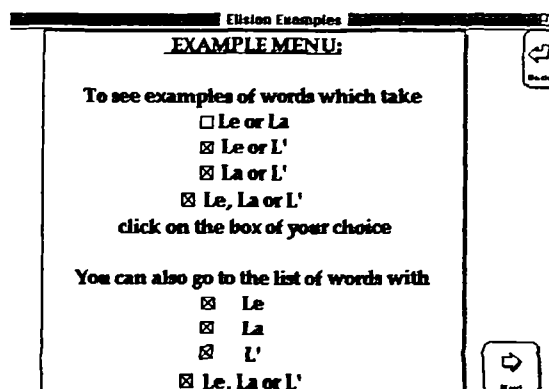


fig 4.6.b. Menu Card (Exploratory Mode)

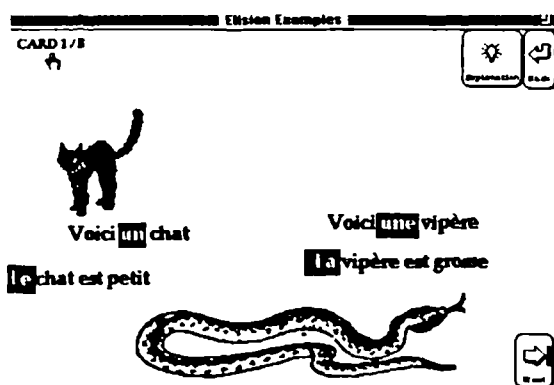


Fig 4.6.c. Example 1 (Explicit/Exploratory)

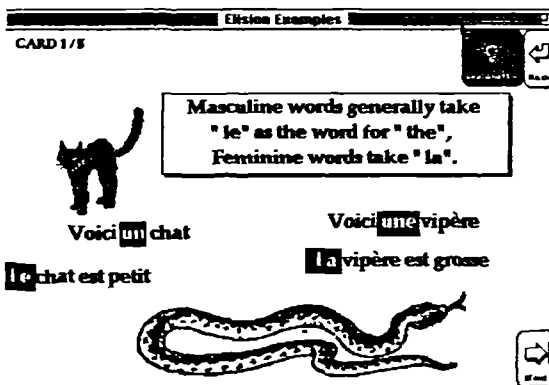


Fig 4.6.d. Example 1 with local Explanation

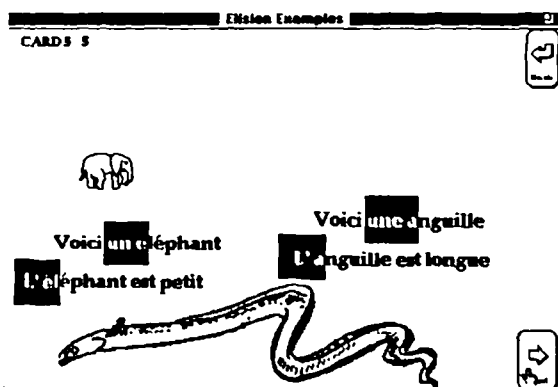


Fig 4.6.e. Example 5 (Implicit)

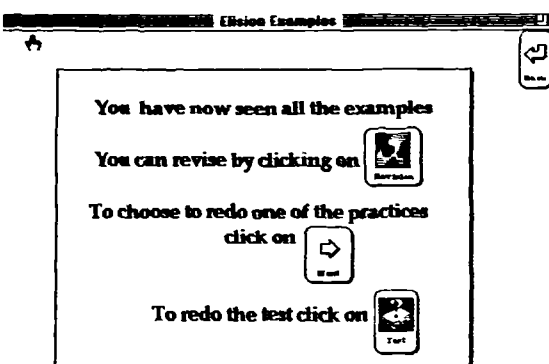


Fig 4.6.f. Final Card of Example Stack

After seeing each pair of examples, the learner clicks on the [next] button in the right hand corner and is automatically directed to the matching practice.

#### e) The Practice Stacks

To each set of explanation and/or examples corresponds a set of exercises, in which to guess, practice and explore the domain of application of the rule studied. For each set, there are two exercises available, an easier one, a 'multiple choice' (MC) exercise containing a set of 10 questions, in which the learner clicks on one of the two, three or four buttons provided as a closed choice and a more difficult one, a 'fill in' (FI) exercise, judged so because the learner must type in the answer in the box inside which the cursor automatically ends up.

The layout of the screen differs according to the mode under operation. In the implicit mode, the [explanation] button is not visible or available, as the learner has to guess the rule to apply (fig 4.7.b.). The learner can only return to the example already shown to him/her, should he /she feel the need to consult it again. In both the 'explicit' and 'exploratory' modes, the learner can also access the corresponding explanation card by clicking on the [explanation] button (fig 4.7.a.).

At all times the learner can exit the exercise by clicking on the [STOP] button which takes him/her to the last card of that practice, from which to carry on with the interaction. Once the correct answer is entered, the program moves on automatically to the next question, save for a three second gap introduced to reinforce the right answer. A wrong answer is accompanied by a 'Boing' or an unpleasant noise to indicate that an error has been made, and another answer is required.

As there are five examples and explanations, there are also 5 pairs of matching exercises, presented first of all in terms of significant opposing features (masculine/feminine with consonants; masculine only; feminine only) and then (mixed) regrouped to increase the level of difficulty of the exercises as the practice progresses. In the exploratory mode, the learners are given a menu to choose their course from, and can go back and forth to the examples and explanations they want to consult. The progression of the linguistic content will be detailed and justified in 4.3.

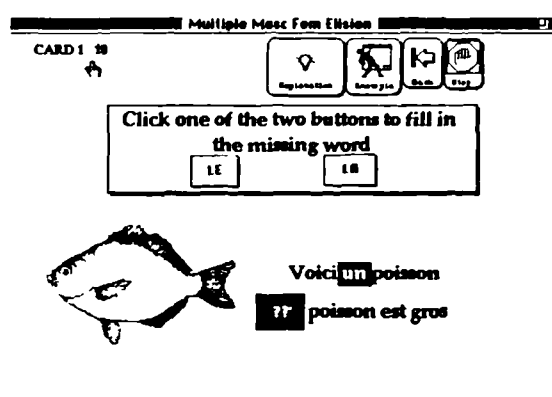


Fig 4.7.a

*Multiple Choice Example (Expli/Explo )*

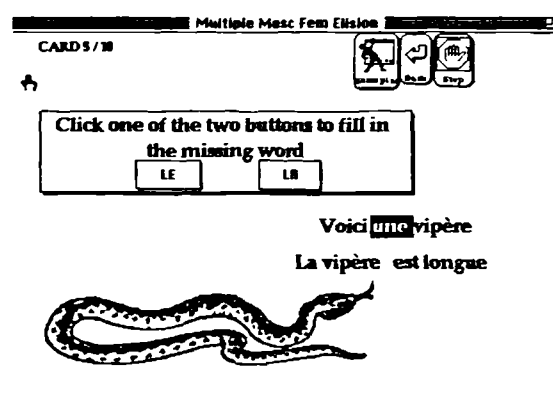
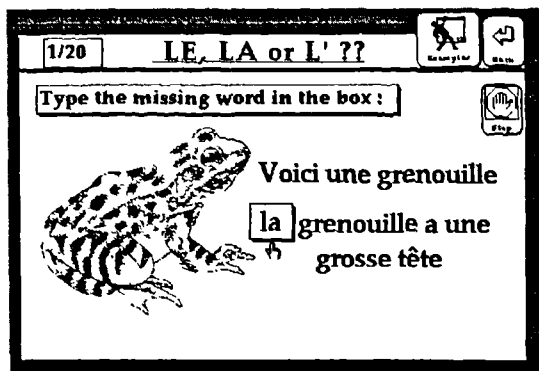


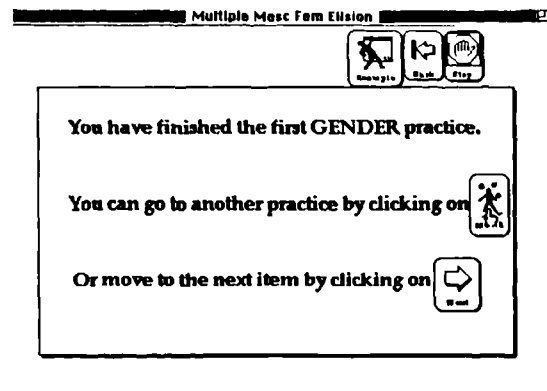
Fig 4.7.b

*MC Example (Implicit) without explanation.*

In the explicit and exploratory mode, the learner has the opportunity to access the on-line [explanation] facility at all times, by clicking on the [explanation] button, symbolized by a light bulb, which gives them instant access to the corresponding explanation card (fig 4.7.a). Access to this facility is not available to the learners working in the implicit mode (fig 4.7.b).



*Fig 4.7.c. Fill In Example Card( Implicit)*



*Fig 4.7.d. Multiple Choice End Card( Implicit)*

g) The Explanation Stack:

The explanation stack was designed as an additional stack to serve as the starting point of the practices in the explicit mode. It also complements the practices in the exploratory mode. In both these modes, the learner can access the appropriate explanation from each of the practice cards, by clicking on the [explanation] button situated in the top right hand corner of each card.

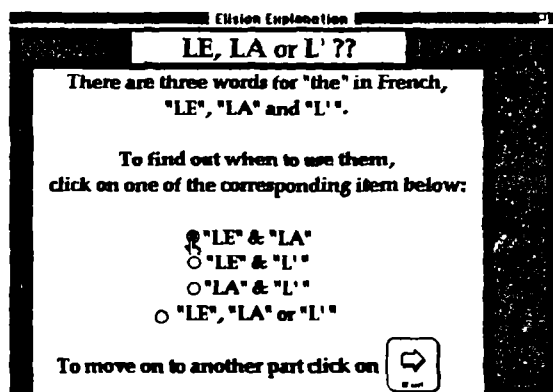
The screen prints of all the explanation cards are provided below for the reader's information. The whole stack consists of an initial Menu card (fig 4.8.a.), designed to be integrated into the exploratory mode, followed by the five explanation cards for each module, common to both explicit and exploratory modes, and a final card, only accessible in the exploratory mode, to allow the learner greater ease of navigation through the rest of the program. These explanation cards cannot be consulted by the learners assigned to the implicit mode.

Each explanation card is linked to a given pair of practices. In our example, 'explanation 1' (fig 4.8.b.) matches the first pair of practices and deals with the gender of the animals. Similarly, 'explanation 2' (fig 4.8.c.) links up with the 'Masculine' stacks and introduces

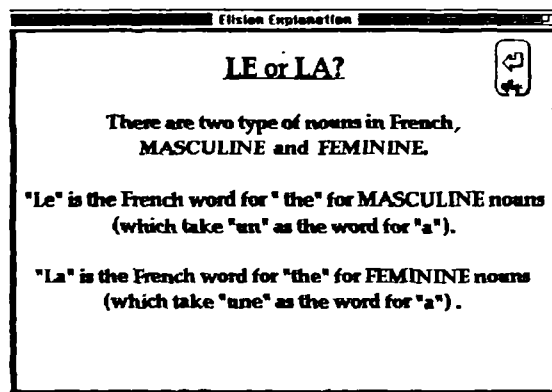


the elision rule; and 'explanation 3' (fig 4.8.d) leads on to the 'Feminine' stack and reinforces the principles of that rule, etc. The progression for each practice will be discussed in 4.3. The other two explanation cards can be consulted in appendix C1.

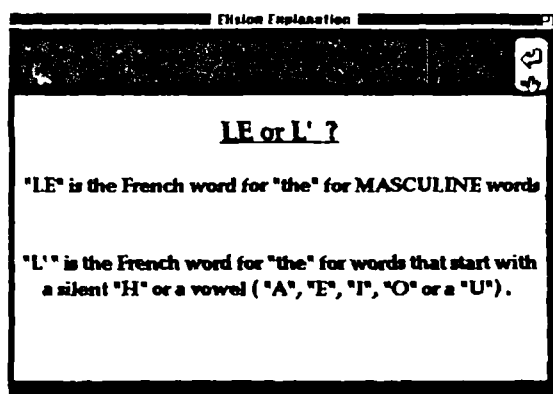
**fig 4.8. EXAMPLES OF EXPLANATION CARDS FOR THE ELISION MODULE**



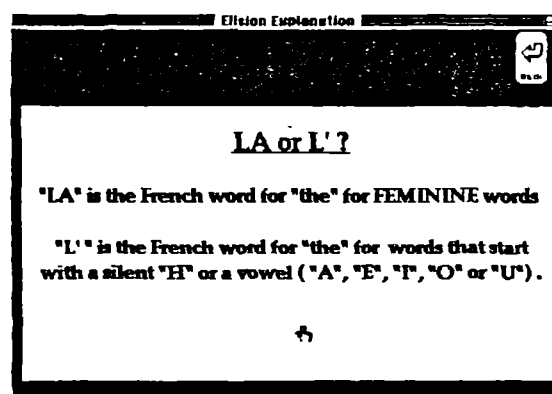
*Fig. 4.8.a. Initial Card (Exploratory)*



*Fig. 4.8.b. Explanation 1*



*Fig. 4.8.c. Explanation 2*



*Fig. 4.8.d. Explanation 3*

h) The Revision Stacks:

There are two parts to the revision stacks, one originally designed for the implicit mode only and a different set of common revision cards, available to all learners, if they so wish. A set of revision cards allows the learners to be able to draw generalisations more easily from a full set of examples at the end of the exercise in the implicit mode. There is a

revision card at the end of each set of practices, which automatically appears to the learner in the implicit mode.

As for the explanation cards, to each set of examples and practices corresponds a matching 'revision' card seen after the exercises: revision 1 ( fig 4.9.a) matches the 'le/ la' practice, revision 2 (fig 4.9.b.) the 'le/ l' ' practice, revision 3 the 'la/ l' ' practice; and revision 4 and 5 ( figs 4.9.c &d) the mixed practices, which combine all the items.

**fig. 4.9. REVISION CARDS FOR THE ELISION MODULE:**

ELISION REVISION 1	
<p>Start with "Le" the following words:</p> <p>poisson morse chat chameau singe rhinocéros lion</p>	<p>Start with "La" the following words:</p> <p>girafe vipère chouette panthère grenouille</p>

*Fig 4.9.a. Revision Card 1*

ELISION REVISION 2	
<p>Start with "Le" the following words:</p> <p>poisson morse chat chameau singe rhinocéros lion</p>	<p>Start with "L" the following words:</p> <p>ours oiseau hippopotame écureuil éléphant</p>

*Fig. 4.9.b. Revision Card 2*

ELISION REVISION 4	
<p>Start with "L" the following masculine words:</p> <p>ours oiseau hippopotame écureuil éléphant</p>	<p>Also start with "L" the following feminine words:</p> <p>alouette autruche hirondelle antilope otarie anguille</p>

*Fig 4.9.c Revision Card 4*

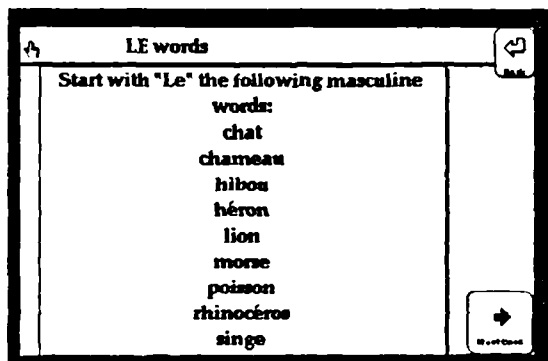
ELISION REVISION 5			
<p>Start with "Le" the following words:</p> <p>poisson morse chat chameau singe rhinocéros lion</p>	<p>Start with "La" the following words:</p> <p>girafe vipère chouette panthère grenouille</p>	<p>Start with "L" the following words:</p> <p>ours oiseau hippopotame écureuil éléphant</p>	<p>Also start with "L" the following words:</p> <p>alouette autruche hirondelle antilope otarie anguille</p>

*Fig. 4.9.d. Revision Card 5*

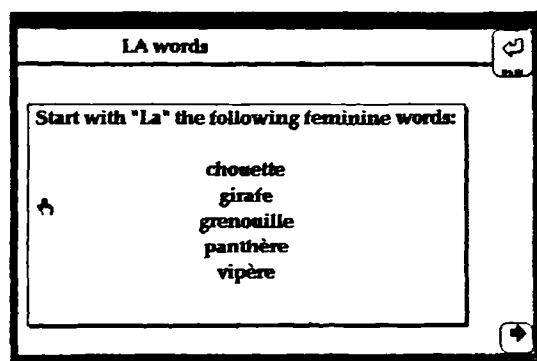
The other set of revision cards, the global set, is available on request, on the click of the button [revision], once the learner is satisfied he/she has had enough practice on the elements of the module before taking the post test. It is accessible through the last card of

both mixed practices. The learner who has selected the revision option can then browse through this set of cards, two of which are shown below:

**fig 4.10. GLOBAL REVISION CARDS FOR ELISION MODULE**



*Fig. 4.10.a. First global revision card*



*Fig. 4.10.b. Second global revision card*

#### 4.2.5. Conclusion

We have given a detailed description of the way the program worked for the elision module. The contraction and the agreement modules operate on exactly the same principles, with slight modifications, mainly to do with the linguistic content of the program and the order of presentation of elements, which will be explained in 4.3.

#### 4.3. Instructional Design:

As mentioned in the first part of this chapter, one of the most important elements of the program was the linguistic content of each of the modules and how this linguistic content is structured and organised within each module. In this section, we describe and justify the linguistic content of each module in turn. This is necessary, as the three different rules may require the exercises to be structured in different ways, as will be shown.

We first start with the elision module, then move on to the contraction module and end with the agreement module. The similarities and differences between each rule and

module are stressed and analysed. Then we attempt to provide a critical analysis of the program content and suggest possible improvements. These could not be implemented immediately as the experiments would have to be redone and this was not possible within the time allocated for the research.

As evident from the program description, each of the modules still retains the same number of sub components, called 'stacks', because of their implementation in Hypercard. The mode stacks are common and identical to all three modules as described in 4.2.2. The other elements vary according to the rules involved, the test, examples, explanation and revision and practice stacks and will be described separately for each module.

#### **4.3.1. Teaching Elision.**

For this module, we have already given detailed examples of the sets of examples, explanations and revision cards, in 4.2.3. In each practice, there were two types of exercises: a series of multiple choice questions (MCQs), following on directly from the set of examples and/or explanations and a parallel series of fill in (FI) practices.

Most sentences contain simple sentences following the pattern:

***Voici un/lune ( ANIMAL ). Le/La/l' ( ANIMAL ) est ( ADJECTIVE ).***

in which the small letters are the constants, and the capitals the variables, with the [un] or [une] highlighted in the prompt sentence, in the MCQs. This was done deliberately to help the learners make the connections between [un] and [le] and [une] and [la], with the aim of assisting them to structure their gender system. This hint was thought to be of particular value to the learners who would be taught in the implicit mode, as they may not have any other clues to guide them, and the preliminary study had highlighted that some learners had found it difficult to spot the appropriate features on which to focus to trigger the application of the rule. To increase the difficulty of the exercises, these implicit help

features were then removed in the fill in exercises and in the last of the Mixed practices, in both multiple choice and fill in versions. For the full text of the practice cards, the reader is directed to appendix C1b.

The original trial elision module only used a mixed set of sentences, which when tried out did not appear to be sufficient for most learners to discover the rules, especially in the implicit mode. This is why the practices were structured and built up to give these learners more of a chance to guess the rules. Therefore, it was decided that the first set of exercises would concentrate on masculine/feminine words only, the second on masculine words starting with or without a vowel, the third on feminine words, as a mirror image of the second, and that the fourth and fifth would mix all the examples.

**a) Masculine/ Feminine Words:**

We established in 3.1. that it would be useful to use the linguistic context to facilitate the acquisition of gender, as it provided clues as to the gender of words. Therefore, the concept of grammatical gender in French was introduced by highlighting the determiners preceding the nouns in the prompt sentences, and stressing that there were classes of nouns regularly appearing with a particular set of articles, linked to each other, in the explanations. The first examples were introduced with the indefinite article, 'un' for masculine nouns and 'une' for feminine nouns, as these are unambiguous for gender assignment.

In the explicit mode only, the learners were introduced to this concept by the first explanation card (fig 4.11.a). Otherwise, the learners first saw the example (fig 4.11.b) and automatically moved on to the first multiple choice practice (Fig 4.11.c.), followed by the first fill in practice, ( Fig 4.11.d ), as shown in fig 4.11:

fig. 4.11. EXPLANATION/EXAMPLE/EXERCISE SEQUENCE:

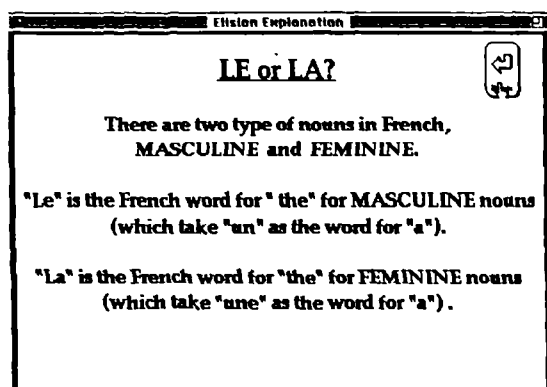


Fig 4.11.a Explanation 1

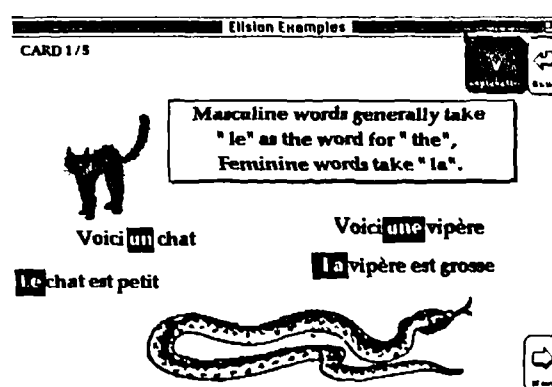


Fig 4.11.b Example with local Explanation

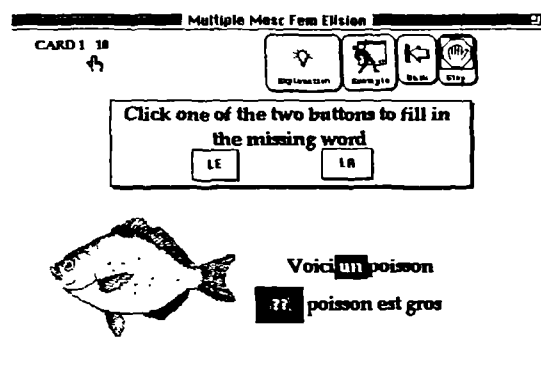


Fig 4.11.c First Multiple Choice Card

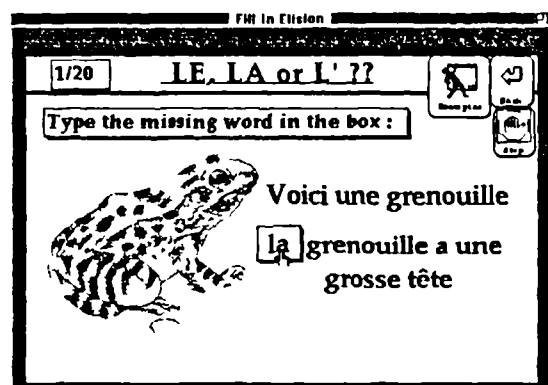


Fig 4.11.d First Fill in Card

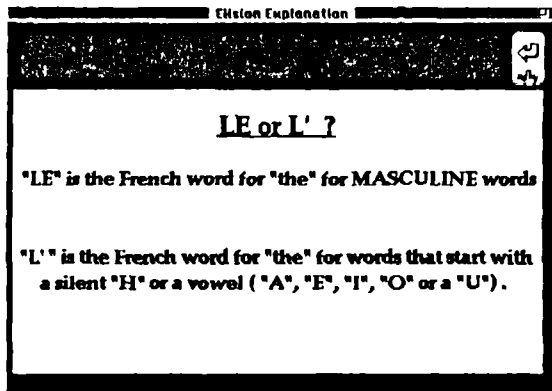
The other cards are listed in appendix C1 for the readers' information.

#### b) Elision Rule for Masculine and Feminine words:

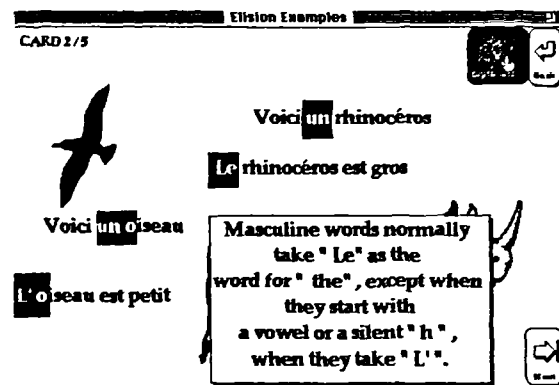
This set of examples, explanation and practices sets out to reinforce the link between [un] and [le] for masculine words and to present the principle of elision for masculine words only. It was introduced specially for the younger or slower learners who seemed to find it more difficult to make the necessary connections, as noticed in the trial run of the program. In the multiple choice exercise again, the indefinite articles are highlighted to reinforce the strength of the connection already hopefully established in the mind of the

learner between 'Un' and 'le', and is dispensed with again in the fill in exercise. Two examples of explanation and practice cards are shown in fig 4.12. and the complete list of sentences used in this set of exercises is also to be found in appendix C1.

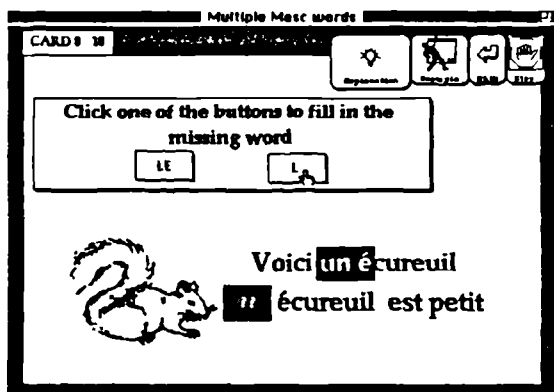
**fig 4.12. MASCULINE WORDS ONLY SESSION SEQUENCE**



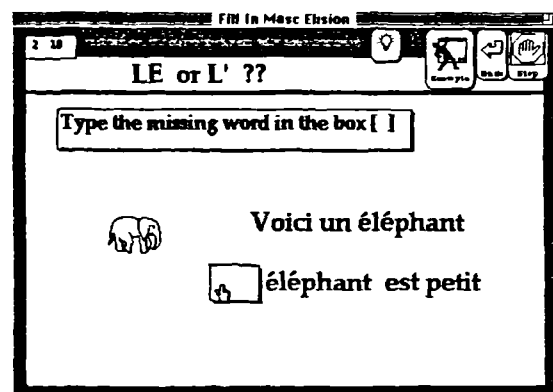
*Fig 4.12.a. Explanation 2 Card*



*Fig 4.12.b Example 2 Card with local explanation.*



*Fig 4.12.c. Masculine Multiple Choice exercise*



*Fig 4.12.d. Masculine Fill In exercise*

The following pair of exercises reinforces the same connections for the feminine nouns. For full specification of the feminine only word list, please refer to appendix C1b.

#### c ) Mixed sets:

We also noticed in the initial and preliminary analyses that some learners found it difficult to combine rules. The next steps in the practice were to mix up the examples used in the

three previous practices to see if the rules had been assimilated and could be applied correctly. Two sets are provided as it was thought that some of the learners might need additional practice, but the second was not compulsory. For the supplementary set of exercises, there are also extra examples, explanation and revision lists available in appendix C1b.

**d) Possible improvements to the Elision module.**

The original set of examples and animals was to be used for two sets of exercises only. As a result of quickly bringing a more structured teaching sequence to the module, the examples and sentences used in the practices for this module lacked variation in the order of the items presented. This was remarked upon during the trial demonstrations of the elision module, and demotivated some of the learners, who thought they had already done the exercise. As the first stage of the experiment was well under way and alterations would have possibly influenced or invalidated the results, it was resolved not to alter this module, but to pay more attention to the order of presentation for the following two modules. The items were therefore randomly presented to the learners and other animals and examples introduced in an attempt to maintain their interest.

It was originally planned to include sound, colour, and other types of exercises, but as the *raison d'être* of the program was to conduct a tightly run second language acquisition experiment in a limited amount of time and not necessarily to design the best possible program to teach gender in French, it was deemed unnecessary to spend a considerable amount of time to add and program in these extra features.



### 4.3.2. Teaching Contraction.

This module is similar to the elision module, with very slight modifications. More care has been taken to vary the order of presentation of items, both in the tests and in the practices. Moreover, new pictures and animals have been introduced, to keep the learners interested and to extend their vocabulary.

The main objective of the contraction module is to reinforce the concept of grammatical gender in the learner's mind, to revise and extend the application of the elision rule and to introduce one of the contraction rules, with [de le] in French contracting into [du]. It was hoped that the learner would build up a set of masculine determiners and make the link between 'un, le' and 'du', on the one hand and 'une, la' and 'de la' on the other, as well as continue applying the elision rule to the words starting with vowels or silent 'h's. In the elision module, all 'h' words were starting with a silent 'h', aspirated 'h's were also introduced, to observe the reactions of the learners and to correct any possible misconceptions that might otherwise be arising in the learners' minds. This continuity and progression built into the exercises should allow us to draw a synchronic profile for each of the learners, for their gender systems and the elision rule.

All the sentences follow the same pattern, both in the tests and practices:

*Voici un/une (ANIMAL ). Voici le/la/l' ( PART) du/de la/de l' (ANIMAL).*

in which the bracketed words in capitals again are variables changing according to the gender of the animal and the part underlined is filled in by the learners.

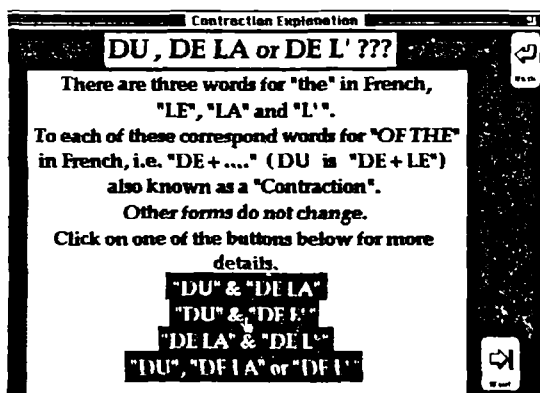
The explanations/examples and practices are again arranged to follow logically from the set of oppositions isolated :

*[du/de la, du/de l' , de la/ de l' , du (h...)/de l' (h...)].*

These were followed by a final series of mixed items, devised to facilitate the learning as much as possible by clarifying the important contrasts.

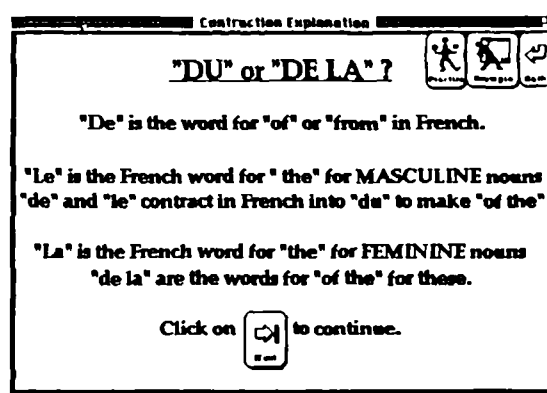
The contraction explanations alert the learners to different possible forms for the words for 'of the' in French. A similar structure to that of the elision module has been built into the teaching sequence, with the first explanation card (fig 4.13.b) introducing the masculine and feminine forms, the second (fig 4.13.c), the masculine words starting with 'h's, the third, feminine words (fig 4.13.d). The fourth (fig 4.13.e) alerts the learner to the existence of two different 'h's, silent and aspirated and the fifth (fig 4.13.f) gives out in full the elision/contraction rules. Each of these explanations is paired to a matching set of examples, and appropriate exercises. The explanation menu and three examples of explanation cards are shown in fig 4.13.

**Fig 4.13. CONTRACTION EXPLANATION EXAMPLE CARDS**



**Fig 4.13.a**

*Explanation Menu Card ( Exploratory)*



**Fig 4.13.b**

*First Contraction Explanation Card( Explicit)*

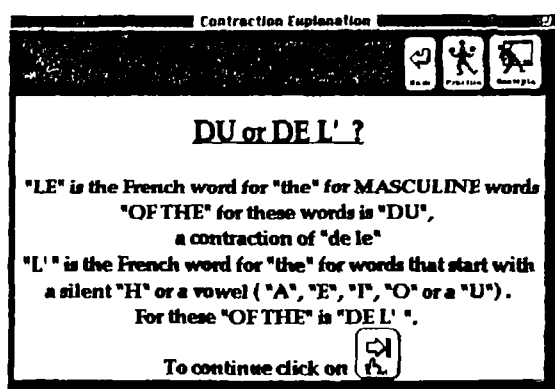


Fig 4.13.c

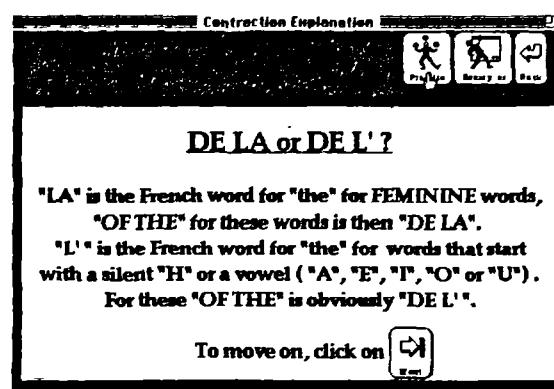


Fig 4.13.d

*Second Contraction Explanation Card (Explicit)    Third Contraction Explanation Card (Explicit)*

In the examples, the vital elements on the cards are again highlighted, the 'un' and 'une's in the prompt sentences and the corresponding 'du', 'de la' or 'de l' ', in the next sentence. To facilitate comprehension, a line drawing of the animal in question is provided and the appropriate part highlighted. Two of these cards, card 1 (masculine/feminine) and card 5 (combined examples) are shown in fig 4.14.a and 4.14.b respectively. The rest can be seen in appendix C2.

#### Fig 4.14. SELECTION OF CONTRACTION EXAMPLES

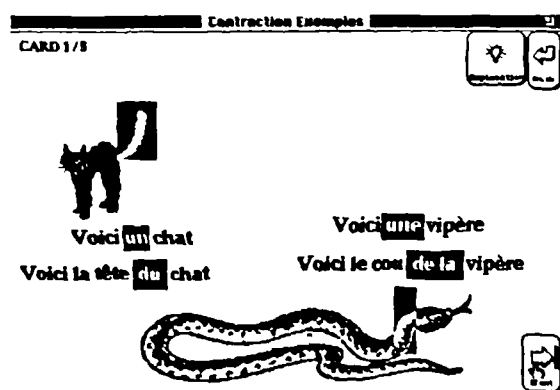


Fig 4.14.a:

*First Contraction Example (Expli/Explo)*

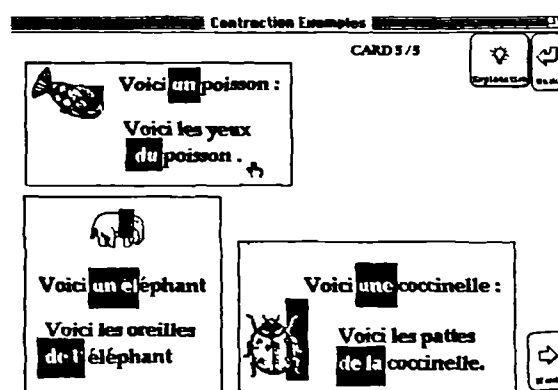


Fig 4.14.b.:

*Last Contraction Example (Expli/Explo)*

The contraction practices are common to all modes, with slight variations in presentation and in the number of buttons on the question cards. Explanation buttons hidden in the implicit mode. A selection of examples of contraction practice cards in both modes follow:

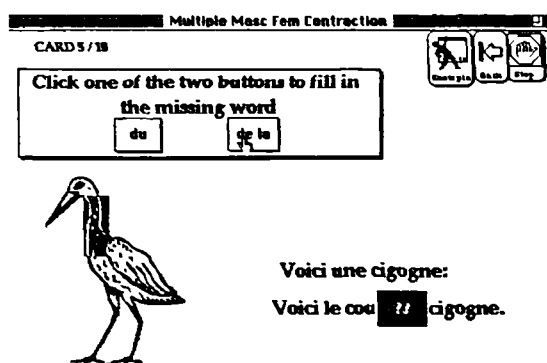


Fig4.15.a

*Example of Multiple Choice Question Card  
(Implicit Mode)*

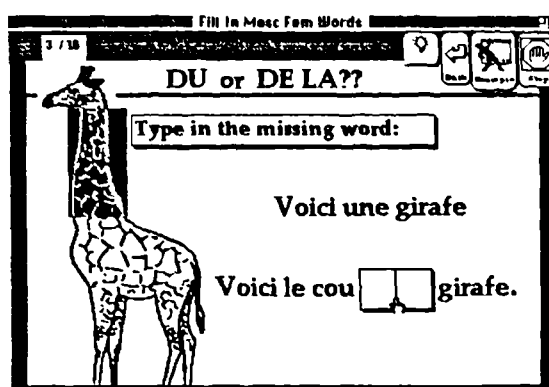


Fig4.15.b

*Example of Type In question Card  
(Explicit and Exploratory Modes).*

In the early stages of the multiple choice practices, some form of help to make the relevant links is provided for the learners, as in the elision module, in the form of highlighting of the indefinite article in the prompt sentences. This form of help is then gradually withdrawn as the learners progress through the modules, and in the more challenging 'type in' practices. To see the full text of the contraction practices, the reader is referred to appendix C2.

Finally, as in the elision module, there are revision cards specific to the implicit mode, and the global revision cards are the last steps in the practice cycle, accessible in all three modes, if so wished by the learner, after all the practices have been completed, before the post test. They consist of lists presented in the form of scrolling windows which contain most of the items already encountered in the examples or exercises of the module.

### 4.3.3. Teaching Agreement.

This module was designed to be more difficult and some of its features reflect this added degree of complexity. The structure of the sentences was deliberately varied to see if the learners had become context dependent and would experience extra difficulties when encountering a greater variety of sentence structures.

Apart from gender, there is an additional feature involved in the adjective agreement rules in French: number, which had not been explicitly introduced in the previous modules - though some of the examples and practices in the contraction module already included intentionally some plural words (i.e. ailes, pattes, oreilles). There are three sentence patterns used, which are in order of complexity:

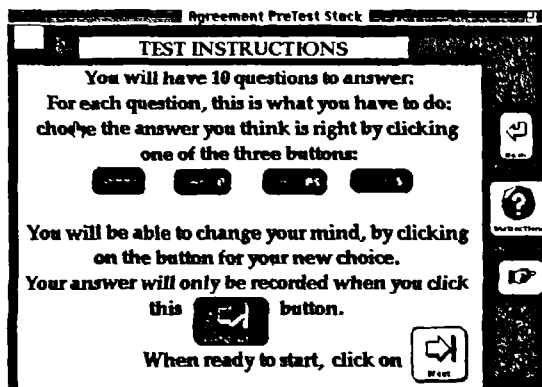
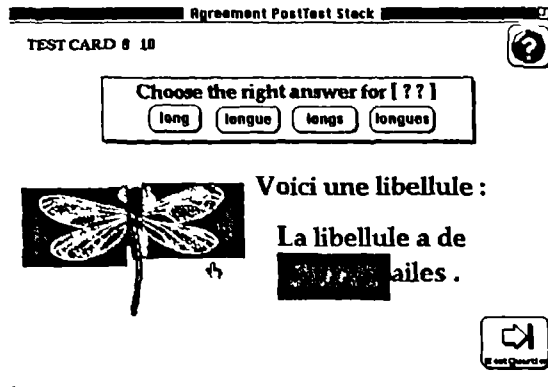
*Voici un/une (ANIMAL).*

*Le/La/l' (ANIMAL) est (ADJECTIVE).*

*Le /La /L' (ANIMAL) a un / une / des (ADJECTIVE) (PART).*

*Le/La/L'/Les (PART) du/de la/de l' (ANIMAL) est/sont (ADJECTIVE).*

These three structures are also represented in both pre and post tests, contain the same questions, randomised in the post test, to assess whether the learners experience more problems and make more errors when encountering sentences of a different pattern.

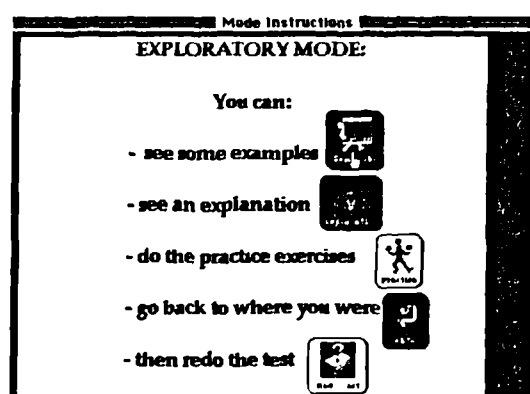
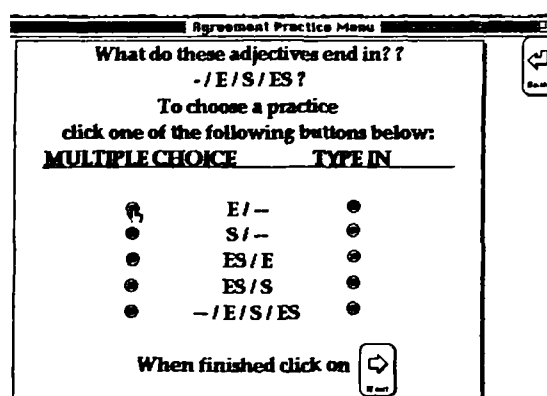
**Fig 4.16. SELECTION OF AGREEMENT TEST EXAMPLES***Fig 4.16.a Introductory Card**Fig 4.16.b Question Card for Agreement Module*

The complete sets of sentences for both pre and post tests is shown in appendix C.3.

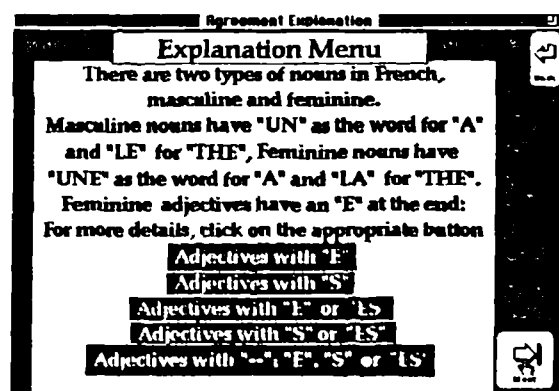
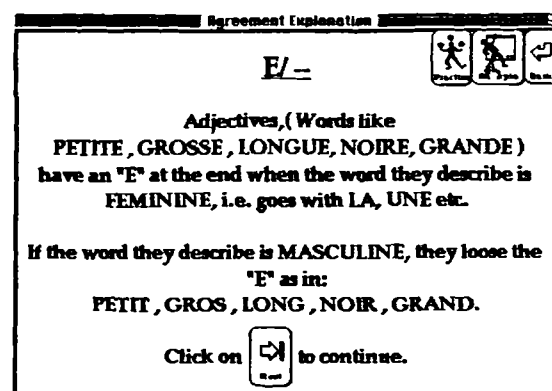
The agreement examples, explanation and practices are also structured, arranged in a similar style to that of the previous modules, in a series of distinctive oppositions with a graded preset order:

- Masculine/ Feminine (E/-);
- Masculine Plural/Masculine Singular;
- Feminine Plural/Feminine Singular;
- Feminine Plural/Masculine Plural;
- Mixed practice.

However, in this module, there is a slight modification to the exploratory mode. The learners, this time around, are given the choice of starting with either the explanations, the examples or the practices, by clicking on the corresponding item on the menu card presented shown in fig 4.17.a. They were also a given free choice in the order in which they choose to approach the practices as shown in fig 4.17.b.:

**Fig 4.17. MENUS FOR THE EXPLORATORY MODE****Fig 4.17.a***Exploratory Mode Menu Card***Fig 4.17.b***Practice Menu card for Agreement Module*

The explanations are also introduced to the exploratory mode learners, by a menu, shown in 4.18.a, followed by the full set of agreement explanation cards in fig 4.18. b-f.

**Fig. 4.18 AGREEMENT MODULE EXPLANATION CARDS****Fig 4.18 a Explanation Menu****Fig 4.18.b Explanation 1 (Masc/fem) card**

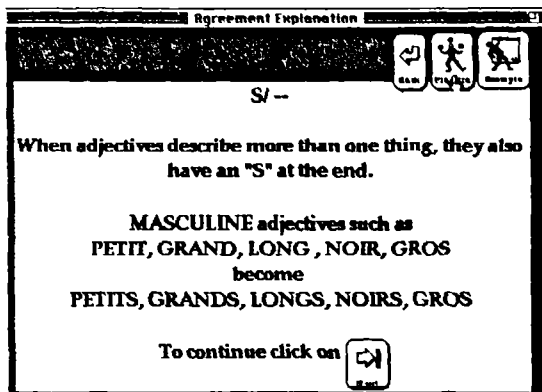


Fig 4.18.c Explanation 2 (masc only)

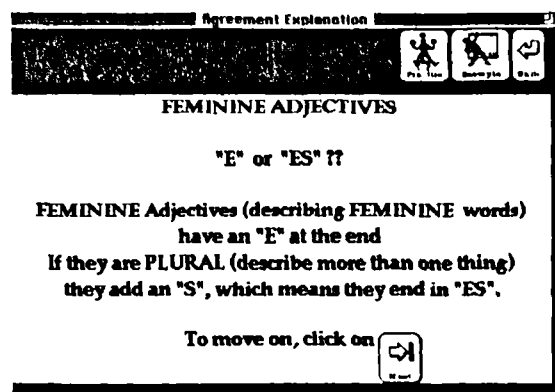


Fig 4.18.d Explanation 3 (fem only)

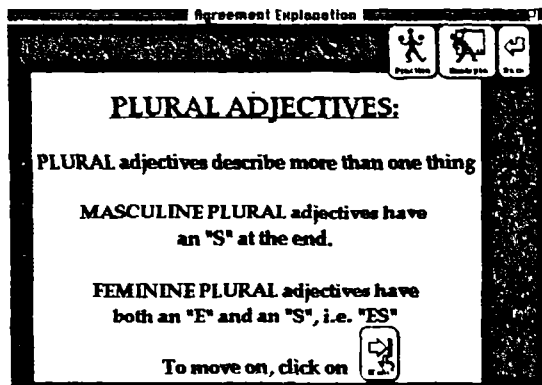


Fig 4.18.e (Plural words only)

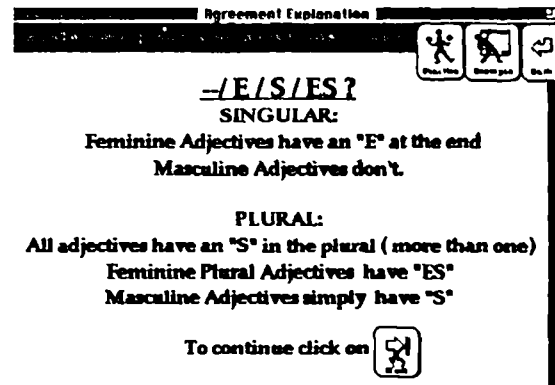


Fig 4.18.f (Mixed words)

Fig 4.18 Menu and Explanation Cards for Agreement Module

The example stack also has a menu shown in fig 4.19.a, designed to give more flexibility and choice to the learner.

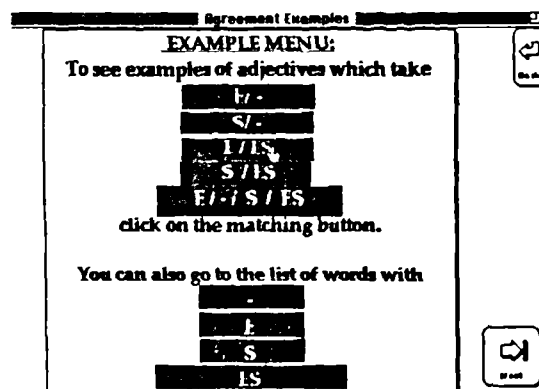


Fig 4.19 Example Menu for Agreement Module



It is followed by four example cards, one without and the others with the local explanation visible, in fig 4.20. The first two (a & b) show singular examples, with different sentence structures, and the last two (c & d) show the introduction of the plural forms for both masculine and feminine words.

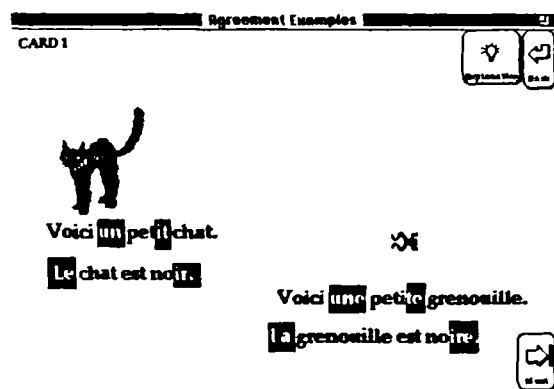


Fig 4.20.a Agreement Example

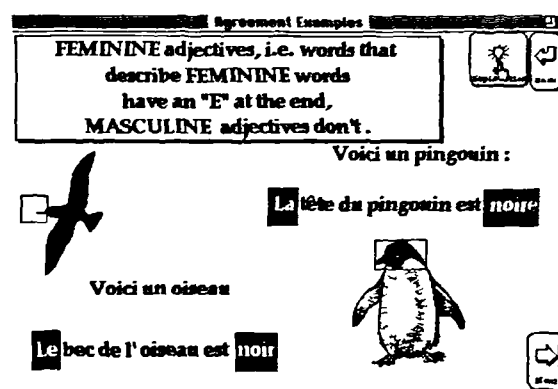


Fig 4.20.b Agreement Example with Explanation

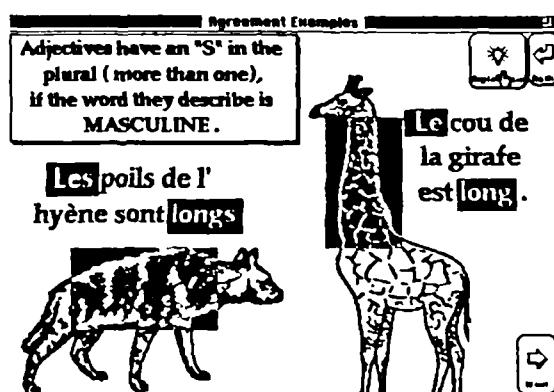


Fig 4.20.c Agreement Example with Explanation of Masculine forms

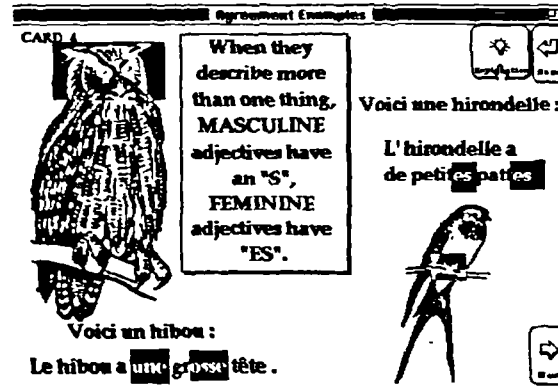


Fig 4.20.d Agreement Example with Explanation of Plurals

The next set in fig 4.21. shows the examples and local explanations for the fourth and fifth set of practices, which deal with plural forms only and all forms respectively.

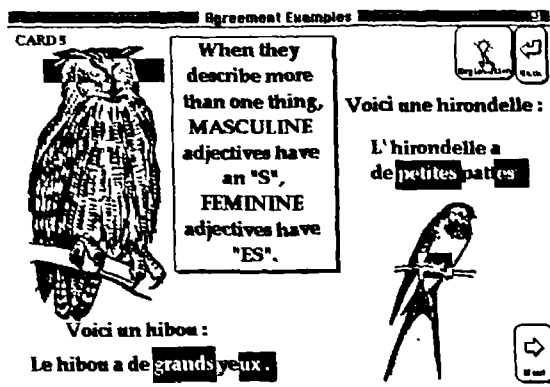


fig 4.21.a Agreement Example with Explanation  
of plurals

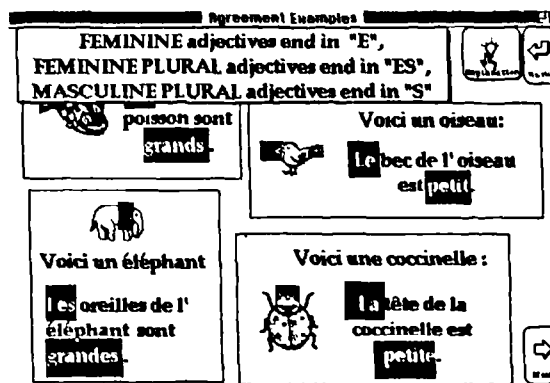


fig 4.21.b Agreement Example with Explanations  
of all forms

Again, there are also two types of exercises for each cycle, with props gradually removed as each of the practices progresses. examples of both multiple choice and fill in practice cards are provided below, which show their relationships with the example cards described above (fig 4.22.a and 4.22.b).

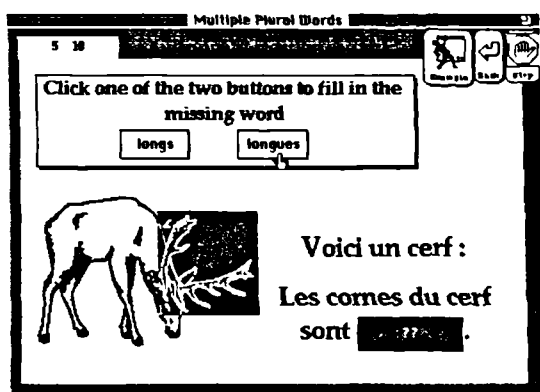


fig 4.22. a

Multiple Choice practice of Agreement

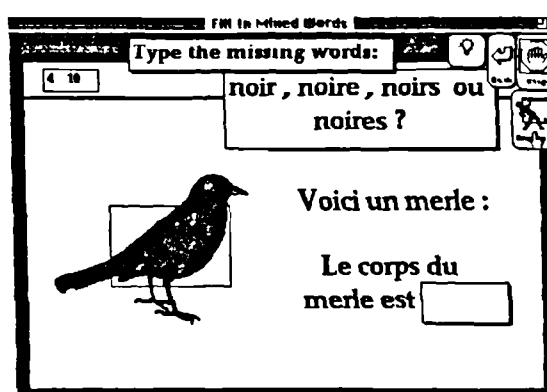


fig 4.22. b

Fill-in practice of Agreement

in the first set of exercises, 'Masculine/Feminine' or [E / ], the different structures of the sentences are gradually introduced, in an attempt to contextualize and then decontextualize the learning of the feminine agreement rule.

The first ten, the multiple choice questions, all follow the pattern

***Voici Un/une (ANIMAL): Le/La/L' (ANIMAL) est (ADJECTIVE),***

in which five different adjectives appear,

***GRAND, PETIT, GROS, LONG, NOIR.***

Then the next six fill in questions follow the pattern :

***Voici un /une (ANIMAL): Le /La /L' (PART) du/de la/de l' (ANIMAL) est (ADJECTIVE),***

and in the last four, the sentence structure is :

***Le / La/ L' (ANIMAL ) a un / une ( ADJECTIVE ) (PART).***

The complete set of the 20 questions for this cycle is available in appendix C3 with the parts highlighted on the screen underlined. Also available in appendix C3 is the set of all the sentences appearing in the agreement module.

There are also revision cards which match each of the practices, presented to the learner at the end of each set of exercises in the 'implicit' mode .

#### **4.4. Conclusions.**

The program has been designed to provide a suitable test-bed for the basic research questions identified at the beginning of this chapter. The implementation in three modes, explicit, implicit, and exploratory, makes it possible to investigate the comparative effectiveness of these for different pupils and different topics. The fact that three topics have been chosen, elision, contraction and adjective agreement, also allows us to compare the different modes for each pupil, without having them repeat the same topic. The record cards also enable us to collect extensive performance data for these topics, and to analyse and classify the kinds of problems encountered by the pupils in these different tasks. The

provision of pre and post tests makes it possible to measure at least some of the learning gains achieved by each module, and to compare the pupils' scores across modes.

In this way, it is possible for the research study to investigate teaching strategies for CALL, and how they relate to the abilities of different learners, and to the characteristics of different linguistic topics, found to be difficult for L2 learners to master. In the next two chapters, the empirical testing of the program is described in detail. Further improvements to the program will also be suggested in the final chapter.

## **5. EVALUATION OF THE PROGRAM:**

In the previous chapter, I explained the rationale behind the design of the gender program and described its implementation in Hypercard, as a set of three modules dealing with the acquisition of three of the rules of the French gender system, elision, contraction and adjective agreement, to test the relative merits of three different teaching strategies, implicit, explicit and exploratory. I also justified and discussed the linguistic content of the program.

This chapter gives an account of the pilot and final testing of the program, of the experimental conditions, the sample of learners used, the recording methods used to collect data and describes examples of sessions with two learners.

### **5.1. The experimental testing:**

Each module was implemented in each of the three modes, mirroring the three teaching strategies, implicit, explicit and exploratory, which were to be compared as to their relative merits. Each module was tested on 32 school children, aged 11-14, selected from the three schools used for the preliminary study. As each module reached initial implementation, it was pilot tested on some of the learners, used in the previous interviews, to correct any obvious defects which could have influenced the results of the second language acquisition experiment. This allowed me to check that the information and data being gathered would give some answers to the research questions explored and detailed in 4.1. The results of the children involved in the pilot testing are not included in the bulk of the main experiment, as there was too little uniformity in the experimental conditions at this stage. The program was remodified in the light of the problems encountered, as mentioned in 4.1.

When the first module appeared ready, the main bulk of the testing began under conditions as uniform as possible, given that the schools were of different types, offered different facilities and arrangements and had different demands on their teachers, pupils and time tables. There were 3 groups of approximately 10 children doing the program in each of the modes. The learners were assigned randomly to one of the three groups, whose composition was roughly balanced across schools, sexes and age ranges, as far as possible.

For the subsequent modules, the same children were used and the teaching strategies were rotated in the order implicit, explicit, exploratory, implicit, etc, so that each of the learners would experience each of the strategies. For example, a learner starting with the elision module in the explicit mode, would then do the contraction module in the exploratory mode and finish with the agreement module in the implicit mode. Each learner had to attend three sessions, doing a different module in a different mode in each session. All learners rotated the modules in the order elision/contraction/agreement. The three groups followed similar paths so that results could be compared within the groups and across the groups.

#### **5.1.1. The motivation and rationale for the testing:**

The program was designed

- (i) to carry out a second language acquisition investigation into the problems encountered by native speakers of English in learning/discovering the rules of the French gender system, and
- (ii) to compare the relative merits of three possible teaching strategies, implicit, explicit and exploratory with regard to the teaching of these rules.

The program offers teaching on three rules of the French gender system, elision, contraction and adjective agreement, with each one offered in three different modes, so

that it was possible to make comparisons between the modes, within individual learners and across a section of learners.

We recall from Chapter 4 that the main questions to be investigated concerned:

- (i) the workability of implicit teaching,
- (ii) the effectiveness of explicit statement of the rules of language for the learner,
- (iii) the value of the 'exploratory' approach, and,
- (iv) the preferences expressed by the learners.

To allow comparisons of the success of the program in each of the three modes for each individual learner and across a group of similar learners, each of the modules of the program had to be consistent in terms of structure and content, so that the learners could be rotated systematically around the three modules in three different teaching modes.

### **5.1.2. The procedure for the testing.**

The procedure utilised to test the program was constrained by external factors: the organisation and the curriculum of the schools, their timetables, the time of the year and by many other unforeseen factors due to the unpredictability of testing human beings, and specially children: illness, strikes, misbehaviour, disaffection, discouragement, etc. It was impossible to control some of the factors involved, e.g. the teaching environment before and between each session, as the experimenter could not exert any influence on what happened outside the interview. The intervals between sessions may also be important, but as the program was being tested as soon as a module was ready, and as three different schools were involved in the scheme, with different lengths of periods, different timetables, holidays, commitments, etc, it was not possible to adopt a more rigorous framework and to standardise these intervals.

### **5.1.3 The experimental procedure:**

To test the program adequately and gather the required data, it was felt that the learners should first of all be given a pre test on the rule being explored, followed by an interview asking them what they knew about the rules and/or to give examples of how they arrived at some of the answers they had given in the test. This was followed by the chosen practice session on the rule in question, with the program, a post test, with the same linguistic content as the pre test, administered to assess their progress. The session ended with a short interview, asking them what they had learnt or discovered in the practices and what they had found difficult, annoying or enjoyable in their interaction with the program.

Each of the interviews was recorded on a cassette recorder, and detailed and extensive manual observations and notes were also taken as a further back up, ready to be rechecked at any time, and compared to the computer records.

For each session, relevant personal details were requested to recognise and identify the learners in later stages, relating to their year, their age, the time they had been studying French, their first language, their computer experience (access facilities to computers, types of activities performed, school computing facilities, home availability, etc).

Then the learners were briefed as to the purpose of the current and subsequent sessions and the research objectives, described as trying out a computer program to find out the way children learn French and the types of problems and difficulties they may encounter in language learning.

The computer interaction started with the pre test. The learners were told that guessing was quite appropriate, if they did not know or could not work out the answer. They were also shown how to alter their answer and experiment with various solutions, and warned



that they would not be told which of their answers were correct. These answers were recorded on their Test record cards, with a score indicating the number of items done correctly, accessible at the end of each test. Notes were taken of the answers given and the number of trials for each item for each learner.

As the learners were consulting their scores and looking at their test answers, they were also asked whether they knew anything about the rules investigated and/or how they had worked out the answers they had given. These details were also recorded.

Then, the mode choice card appeared, and the experimenter assigned them to one of the three groups and explained their task and what they were supposed to do in the exercises:

- look at the examples, do the practices and read the revision card, in the implicit mode;

- read the explanation, look at the examples, practice in the explicit mode;

- and choose what they felt like doing in the exploratory mode.

The learners were also briefed that they could opt out of any exercise by clicking on the [STOP] button, whenever they had become frustrated or thought the practice was too easy for them.

After the post test, the learners were questioned on their impressions of the program, i.e. what they thought they had learnt or worked out, asked to state the rule or to explain it, to justify some of their answers, to mention any problems they had met, to suggest possible improvements to the program, and if they would like to carry on with the experiment, and finally thanked for their co-operation.

#### **5.1.4 Timing:**

As the gender program was designed to test the relative merits of three possible teaching strategies to teach the concept of gender and gender agreement to young learners in London secondary schools, it was implemented in three distinct but similar modules, each of which can be used separately to give a session lasting between 30-45 minutes. These sessions had to fit in with the normal duration of a secondary school period as testing the learners for hours on end would have caused serious disruption to the delivery of their curricular needs. Moreover, longer sessions might also have become unproductive as the children have a rather limited concentration span in the best of cases and might have become more reluctant to participate in subsequent sessions. 45 minutes was found to be the time necessary to fit in the pre and post tests, the interviews and the practices.

Though the interviews were meant to last between 30 45 mns, there was no way to standardise the time taken, as some children were very fast and just took over 30 minutes to complete all the stages whereas others would have been a long way from finishing, had we kept to a very strict timing. It was felt best to let them do a least a certain amount of the work and to look at the time factor separately. Moreover, it was impossible and undesirable to shorten the interviews, as some valuable data and insights might then be missed. This sometimes led to difficult situations with the variable length of the periods, the approach of breaks, lunches, school exits, which could not always be timed in accurately.

#### **5.1.5. The sample for the testing.**

The three schools used for the testing of program were the same Islington schools as in the preliminary study, one Grant Maintained Boys School close to the City of London, one Mixed Comprehensive and a Girls' Comprehensive. Each of the schools provided a

different number of learners, 14 in the Boys only School, 10 in the mixed School, and 8 in the Girls School, giving 32 children to be tested. It was hoped that at least 30 children could be counted on to finish the study.

As inevitable in a school based study of this type, uncontrollable factors interfered with the data collection. The only school from which none of the learners were lost was the Girls Comprehensive, but this might be due to the fact that the experiment only spanned over three weeks in that school, which made the running of the experiment smoother and more reliable. Glitches occurred in the other two schools, which had not been foreseen at the start of the experiment, and slightly threw off the balance of the groups between Boys and Girls.

However, all the children's answers and data have been considered in the stages in which they participated. The final number of totally usable records is in the end 24, with four learners dropping out or unable to complete the full sequence, and 4 errors, which invalidate part of some children's contribution. The final sample is then made up of 7 children for group X, 1 boy and 6 girls, 10 learners for group Y, 8 boys and 2 girls, and 7 for group Z, 4 boys and 3 girls. This makes group X dominated by girls, Y by boys and Z roughly equally divided.

Though this was very regrettable, the target number of children to be used was set arbitrarily in accordance with the qualitative nature of the analysis to be done, and the final number was still sufficient for this purpose. The intention was to obtain qualitative data that would reveal the nature of differences between the design features, backed up by quantitative data on scores that should reveal clear differences, not requiring statistical analysis. For this purpose 24 case studies would be sufficient.

#### **5.1.6. The records obtained:**

As already mentioned, the records taken of the sessions were to be varied in nature and shape, with the computer recording the answers in the pre and post test and scoring them, to allow for the two to be compared. The experimenter also took as many detailed notes as possible, about the timing of each part of the session, which was checked against the audio-tape record, the paths and steps taken and answers given by the learners in each session, for which a record sheet was later devised and used. The audio tape recorded all the auditory signals of the session, comments, questions and answers, sighs, mouse clicks, program jingles, etc.

All these records allowed us to chart the paths taken by the learners especially in the 'exploratory' mode, and to study error patterns at particular stages of the acquisition process. An edited example of the session record sheet is provided in appendix D.

In addition, as mentioned in Chapter 4, the computer was automatically recording the answers of all the learners in both the pre and post tests as shown in the record card in fig 5.1. below. These cards record, from left to right, top to bottom, the chosen pseudonym of the learner, in the left-hand corner field, the answers in the pre and post tests in the two furthestmost left hand fields, and the scores achieved in both tests, the words involved in the questions of the tests, the mode in which the practices were completed, and the time taken to complete the test.

<b>Elision Record Card</b>																																															
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**5.1. Record card for one pupil, one mode , one rule.**

Further, all the audio-recordings are available for inspection and can be referred to when further information or clarification is needed for a particular part of the interview. These have been used to compile a comparison of the times taken by each of the learners in each of the modes and to get exact quotations from the learners.

All these types of records are not only useful in their own right but also complement each other. A fragment of the taped session can be recontextualized if the notes taken by the experimenter are consulted. The program can also be re-run with the answers of the learners so that the sessions can be resimulated. The notes also allow quick reference to some sections of the tapes. (An example of notes taken during a session is available in appendix D2).

The computerised records for the tests can be checked against the manual records. This proved useful in decreasing the amount of human error which can take place in any experiment. Total reliance on computerised records might also have been dangerous, had there been vital errors in the program or had the program failed to operate satisfactorily.

To illustrate how this data has been analysed and combined to build up the research findings for the whole sample, I shall show how the complete analysis is carried out for two different children in the next section.

## **5.2. The Nature of the Data: Two Contrastive Case Studies**

The best way to illustrate how the program works is to give detailed accounts of sessions with two contrasting learners. The two learners chosen belonged to a different group, and experienced the three different modes with varying degrees of success. For the girl, Shanice, the program appeared to achieve its objectives: however, for the boy, Brandon, it did not appear to help in any of the modes, though he had enjoyed his sessions.

### **5.2.1. Shanice 's Case:**

#### **a) Elision in the exploratory mode:**

Shanice was 13, had studied French for nearly two years, was a native speaker of English and had used Macs and other computers in schools, but did not have one at home. Shanice went through the preliminaries requesting the initial information in 5 minutes.

She then started the test, after the customary briefing, initially appeared to be nervous and slightly aggressive on the keyboard, as she breathed and sighed heavily, found the mouse sticky and tricky to use at times, clicked too hard and made the program jump one card on

occasion. However, she made good use of the possibility to change her answers in the pre test, in the second, third and sixth questions. This part lasted another 5 minutes.

She was surprised not to be told the right answers at the end, felt a bit disappointed about her score, 2/10, but was reassured when told that it did not matter if she did not do well in the first test. All she declared knowing about the rules was that " 'le, la and l' ' meant 'the' in English", that "they had something to do with the word", but she could not remember what that something was. Her strategy for working out answers was to sound the words out in her head to see if they were 'right' with 'le, la or l' '. This interview and the demo given for the exploratory mode lasted another 6 minutes.

Shanice had no problem deciding which elements of the practice to start with in the exploratory mode. She started by looking at explanation 5 and example 1 and again at the local explanation offered on this card, after being shown how to. She then moved on to the exercises and completed the first MC1 without an error in 2 mns. She also tried the Type In exercise FI1 and still did not make any errors. At the end of FI1, when asked what she had worked out, she explained that she matched 'un' with 'le', for masculine words, and 'la' with 'une' for feminine words.

In FI2, she made 1 error on the 'h' of question 5:

**[5) (Le) l' hippopotame.]**

She had to be shown how to use the delete button on the keyboard. The next exercises, MC3 and MC4 were also executed without an error, and she also gave correct answers in FI4, after which she elected to return to the test.

In the post test, she only hesitated once on Question 9:

**[9) (Le)/L' ours a de grosses pattes],**

changed her mind from 'le' to 'l' ' and ended up with a perfect score of 10/10.

In the post interview, she declared that " 'l' ' was for words that started with vowels and 'h' s', 'le' was used for masculine words", which she could recognise because they were preceded by 'un' in the prompt sentence and that " 'la' was for 'female' words". She still had problems using the correct terminology, for when referred back to question 8, she gave the gender of 'tête' as masculine.

**[8) *Le lion a une grosse tête.*]**

She was able to state the rule correctly, but this did not mean that she would necessarily be able apply it consistently. Correct statement of the rule does not ensure consistency in its application, as the rules can be misunderstood or misapplied.

When probed about her impressions of the program, she declared that she had found it hard at first, but had experienced no further problems after consulting the explanation and example; that she had learnt something about 'le, la and 'l' '; that the program was alright and that she did not object to doing more, perhaps harder work. For details of the session refer to appendix D. This shows that consulting the explanation can be of some help for the learners, though it does not guarantee success.

The session had lasted just about 30 mns, with 9 mns of compulsory testing, 12 mns of practice, some of which optional and the rest (10 11 mns) spent in reading and clarifying instructions and answering interview questions. She had chosen to consult the global explanation first (Explanation 5) and to look at the first example only, had done 6 out of the ten possible exercises without having to refer back to any of the other examples or explanations, before proceeding successfully with the post test. She used the exploratory facilities and options more as an explicit mode.



The program had achieved its objectives with her. From a score of 2/10 and a position of being unable to state any of the rules, Shanice not only did very well in all the practices, most of the time achieving a perfect score, but also sailed through the post-test, where she got 10/10. She had made the connection between 'un' and 'le', the masculine words and was able to state that 'l' ' was to be used with words starting with vowels and 'h's.

b) Contraction in the implicit mode:

A week later, Shanice started the second session, with the contraction module in the implicit mode. The preliminaries, including the pre test, spread over 4 mns only this time, with the added request to state the reasons for her answers in the test, in an attempt to gain more insight into the reasoning of the learner. Shanice stated that she had guessed all answers and made only one mistake on item no 8:

***[8) Voici les yeux de (l') hibou.]***

When asked for the principles governing her answers, Shanice stated that 'de la' went with feminine words, 'du' with masculine words and 'de l' ' with words starting with a vowel or an 'h'. It appeared that she had extended the knowledge previously acquired in the elision module to the domain of this test, inferring that the same principles must apply. This was confirmed by subsequent questions, which revealed that she had assumed that it worked as last time.

Before the practices, she was warned that she would not be given any explanations this time and had to work out things for herself, from the examples, the practices and the revision cards. The first, MC1 was completed perfectly correctly, with no errors in just over 1 mn. In the second, MC2, she made two errors on items 9 and 10, in 9 because of the 'h', which she did not appear to have worked out yet, and in 10 because she thought

there was 'a' at the start of the word for the part of the body, 'aile' and this is what she looked at for assigning the determiner.

**[9) Voici un héron: voici l' aile de (l') héron.**

**10) Voici un pélican: voici l' aile (de l') pélican.]**

This is very important, as it shows that even a very good learner finds it difficult to sort out the dependency relationship between nouns and adjectives within the sentence and might need some prior training to identify these successfully.

The third, MC3 was completed without any errors and at the end of this part of the practice, Shanice was able to state the rules involved. She recognised that the source of her errors was the fact that not all 'h's went with 'de l' '. She made another error in the fourth practice, MC4, again on an 'h', in question 7:

**[7) Voici un hibou: Les pattes (de l') héron sont longues.]**

She had spent a total of 11 mns on the practices and chose to go ahead with the second test by this stage. In the post test, Shanice got 10/10 and mentioned afterwards that she had worked out that all the feminine words with 'h's took "de l' ". When questioned about her impressions of this part of the program, she mentioned that it was more interesting than the first part and that she had learnt something.

This session had lasted around 27-28 mns, with about 11 mns of practice. So having understood and remembered the elision module, she had transferred the rules she had learnt to the contraction module. The implicit mode was successful in her case as she did not need a restatement of the rules, and only had needed to master the new information concerning initial 'h's'. However, it might not have worked so well for a completely unrelated topic.

c) Agreement in the explicit mode:

The third and last session on adjective agreement took place a week later, in the explicit mode. It lasted somewhat longer than the previous two, which confirms the fact that this part was designed and rightly predicted to be substantially more difficult than the other two. After being briefed that this time we were dealing with the endings of adjectives in French, Shanice proceeded with the pre test and hesitated only on one item:

**[2) *le héron a un (longs/longue) cou.*]**

Her score in the pre test once again was poor (0/10), and she declared at the end that she had again guessed on all the items presented to her. Further questioning ascertained that she did not know the rules at all and had not been taught adjective agreement in class. This part of the session lasted 6 mns approximately.

The procedure and structure of the agreement module was then explained to her, she was also advised to ask questions about things she did not understand, that it would assist the experiment if eventual problems were mentioned.

Shanice found the first practice (MC1), which dealt with a masculine/feminine opposition, fairly straightforward, took time to read the first explanation, and to look at the first example and achieved a perfect score of 10/10 .

In the second part (MC2), she made two errors, between 'grosses' and 'gros', on the irregular items, 2 & 3:

**[2) *Les yeux de la grenouille sont (grosses) gros;***

**3) *Le cou de l' aigle est (grosses) gros;*]**

demonstrating, that though she might already have worked out the general rule, she still understandably experienced problems with irregular forms.

She also chose to have more practice on this item and, with the increased complexity of the sentences introduced, made even more errors on items 1, 3, 4 and 6 (the student input is underlined) :

*[1) Le raton-laveur a des yeux (noir) noirs.*

*3) V.....: le pingouin a un (grosses) gros corps.*

*4) Le merle a un corps (noirs) noir.*

*6) L' épervier a un (petits) petit bec.'*

She dealt with the increased difficulty by referring back to the examples again and again, to try and work out what was happening. She was very good at navigating and using all the program facilities. From her remarks, it was clear that her main problem was identifying the word to focus on in the sentence, i.e. connecting the head noun and the adjective and working out its gender, as the sentence structures were varied, as mentioned in 4.3.5..

It was not obvious how to explain all the errors made by this learner. Several possible explanations are provided below:

- in (1) the animal is masculine and 'yeux' does not end with an 's', and therefore does not look plural. (One would have to look at 'des' for a clue.) No highlighting was provided in this exercise.
- in (3) this time, the governing noun, 'corps' ends with an 's'. The learner has been constantly puzzled by the forms taken by this irregular adjective, but could have assigned the ending 'es' by proximity.
- in (4), again, the same word re-appears and a similar error, which may be attributed to the 's' at the end of 'corps', which the learner may have thought to be a plural word because it ended in 's'.

- in (6), this time, the learner chooses the wrong answer, for no apparent reason, except perhaps an over-generalisation of the previous rule.

At this stage, the learner was confused and had to go back to the example to try and work it out. Then she decided to do the next practice (MC3), involving the feminine forms of adjectives. She only made one error on question (7), for which there is no obvious explanation coming to mind:

*[(7) Voici un chat: la tête du chat est (noires)/noire.]*

Now feeling fairly confident, Shanice decided to skip the next two practices, regrouping and mixing up all the plural forms. She then moved on to the mixed practice, which randomly mixes examples from all the previous exercises. This time in both MCS and FIS, she experienced considerable problems, as she got 5/10 correct in the multiple choice exercise and 4/10 in the fill in version. Perhaps this was because she had missed a vital practice offering vital clues about the plurals. The relevant items, where possible, were highlighted in the first exercise, but not in the second, as it was meant to be more difficult and challenging. The errors made by Shanice in these exercises are shown below, in brackets, underlined, with the words highlighted in the program in capitals:

multiple choice errors (MCS):

*[(3) LE bec du pélican est (grands) grand.*

*(4) LES bosses du chameau sont (grosse/gros) grosses.*

*(6) LE bec du pingouin est (petits) petit.*

*(8) Voici un chat: le chat a UNE queue (noir/noirs/noires) noire.*

*(10) Voici un papillon: le papillon a de (grands) grandes ailES.]*

Type In errors (FIS):

*[(1) Voici un lièvre: Le lièvre a les pattes (noirs) noires.*

- (6) *Le cochon a une (petit) petite queue.*  
 (7) *Les yeux de la grenouille sont (grosse/grosses) gros.*  
 (8) *L'écureuil a de (petit/petite/petits) petites pattes.*  
 (9) *La girafe est (grandes/grands) grande.*  
 (10) *La chouette a de (grandes) grands yeux.]*

In several cases, it also appears that the learner is matching the adjective with the wrong noun, as in the second practice of the contraction module. This would produce systematic errors and most of her answers to the multiple choice and the fill in exercises would be consistent with this hypothesis. It would not explain all the errors encountered in these two exercises, i.e. questions 3 & 6 in the first exercise and question 9 in the second.

At this stage the experimenter gave to the learner the advice to concentrate on what was being described, the part of the body rather than the animal, to try and give the learner a clue about the dependency relationships between noun and adjective in a sentence of this type. Most learners have never done any grammar and are unfamiliar with linguistic metalanguage. The learner went back to the mixed plural exercise and only made one error on the first question, again consistent with the hypothesis that she was matching the gender of the animal with that of the adjective :

*[(1) Les pattes de l'écureuil sont (petits) petites.]*

Shanice then consulted some revision cards and went on to do the post test, in which she achieved a score of 9/10 with an error on question 3 and a hesitation and correction on question 9:

- [(3) Voici un hippopotame: Les oreilles de l'hippopotame sont (petits) petites.*  
*(9) Voici un pingouin: Le pingouin a un bec (noirs) noir.]*

The sources of the learner's errors were not always straightforward. As she was also unable to state the rules she had applied, we went back through some of the post-test questions (10 & 8), to try and establish the principles she had used in giving her answers.

***[(10) Voici une panthère: la queue de la panthère est noire.***

***(8) Voici une libellule: la libellule a de longues ailes.]***

In each case, the learner showed she had matched the gender of the animal with the gender of the adjective and established cognitively whether the parts of the body were singular or plural (one or more than one), therefore only getting the right answer if the animal and the part of the body were of the same gender. One of our hypotheses was then confirmed, that most of the errors of the learner stemmed from an inability to match the adjective with the right noun. The learner had learnt to apply the gender rules correctly but needed more training in recognising the dependency relationships between adjectives and nouns in a sentence. This was not the first occurrence of such an error, as we have remarked.

The program had not totally achieved its objectives, even with a good learner. Though the learner improved her rate of success and understanding, after being given the hint to concentrate more on the part of the body, this did not prove entirely successful. She had applied the hint provided to the number of the word and not the gender. Different strategies would be needed to attempt to remedy the problems. It was clearly unwise for this learner to skip two of the exercises on offer. With the information the program had on her performance on the next two exercises, it would be possible to advise returning to these.

#### d) Lessons learnt from Shanice's case.

The analysis of this case study tells us very little about the implicit mode, as the first module had been successful enough for the learner and there was little to learn from this

mode. The explicit mode was only partly successful, and although the learner used several of the options quite well, she needed more direction to be able to master the complexity of the agreement rule, more guidance or tuition on matching the adjective with the right noun. The exploratory approach had worked well, as the learner was able to make appropriate use of the explanations on offer. She used it as a shortened explicit mode, consulting the global explanation first and illustrating the rule with a few examples and proceeded through the exercises with very few errors.

### 5.2.2. Brandon 's Case:

The next example is taken from Brandon, a 12 year old boy having also done nearly two years of French, native speaker of English, who chose the pseudonym of LC.

#### a) Elision in the explicit mode:

Brandon was assigned to the group which had to start with the explicit mode, for the first session. After being briefed about the procedures for the test and the practice, he proceeded to read the instructions and said he understood them perfectly well. He asked for clarification on the function of the buttons and tried them out for himself, voicing aloud what he was thinking. Brandon kept muttering, often inaudibly, all the way through the pre-test. His eagerness to click and see something happen made the program jump several times over one or two cards. He also was confused by the highlighting, wondering whether the eyes or the head of the animals were highlighted. He worked out most of his answers aloud, but there was nothing really significant to report.

His score in the pre-test was 5/10. His errors occurred in questions 1, 3, 6, 8, and 10 on the following items (The errors are again underlined):

**[1) La anguille, 3) la cochon, 6) le grenouille, 9) l' lion, 10) la singe.]**



He mentioned in the interview that he already knew some of the words, i.e. 'girafe, lion, etc'. When questioned further about his knowledge of the 'le, la and l' ' he added that :

'le' was the word for 'the' for 'lion' and 'chameau', because the camel's neck was long, and the lion had lots of hair;

- 'girafe' had 'la' as the word for 'the' because the gap left for the word on the screen looked bigger to him.

- 'le', he explained was for 'long, tall' things; for 'la', he sort of half guessed and half tried to remember.

- 'l' ' went in front of words which started with 'é' or 'h' , which did not seem to be far from the real rule.

When starting the practices, Brandon thought this was a test again, as the exercises had nearly the same format as the test. He got very impatient with the program, which was a bit slow because of the number of recording operations it was performing, i.e. the name of each part of the module entered and the time of entry. This recording was abandoned for later modules. He was also puzzled by the 'boings' for the wrong answers. He then read and examined the explanation and examples provided.

In the first exercise (MC1), he referred back to the example several times, when he reached the third question of the exercise, still over-clicking on the mouse. He spotted that some of the animals of the test were also used in the practices. He achieved the same score as in the pre-test (5/10) and made 5 errors in questions 3, 4, 6, 8 and 9 which follow:

**[3) la morse, 4) la chat, 6) le chouette, 8) le panthère, 9) la singe.]**

The matching fill in exercise (FI1), at the start of which he had to be given a demonstration of the key pad, did not seem to give him any further clues, and he also made another 5 errors on questions 1, 2, 6, 8 and 9.

**[1) le chouette, 2) la chameau, 6) le girafe, 8) la lion, 9) le panthère.]**

He was very nervous, felt uncomfortable, commented on the stiffness of his legs, expressed surprise and disappointment at not being able to see his score, which was not compiled and calculated in the exercises. The answers given were inconsistent with the hypotheses he had formulated at the end of the pre test, which suggests that he is not applying any rule consistently.

He then moved on to the next set of exercises. In the second (MC2), his score slightly improved with 4 errors only on questions 2, 6, 8 and 10 :

*[2) le ours, 6) l' rhinocéros, 8) le écureuil, 10) l' chameau.]*

There was a further improvement, 2 errors only in the subsequent Type In exercise (FI2). He found it quite difficult to get used to typing in the apostrophes and to correcting the numerous typing mistakes he had made. His errors were:

*[4) l' lion, 10) le écureuil.]*

Though he had been shown the rules, he still found it difficult to apply them. Moreover, he was not consistently acting on the hypothesis he had formulated at the end of the pre test, that 'l' ' went with words starting with 'é', though he appeared to get most of the 'h's right. Brandon also said he remembered some of the items and mentioned those which he thought had previously appeared, even though his answers did not improve even on these occasions.

In the third set of practices, Brandon made 3 errors/8 possible answers in MC3 on questions 5, 6 and 8 :

*[5) la anguille, 6) la antilope, 8) l' chouette.]*

and 3 errors/8 possible on questions 1, 3 and 5 in FI3:

*[1) le, l' grenouille, 3) la antilope, 5) l' vipère],*

showing that he still did not apply the elision rule correctly, at least for words starting with vowels, even though he had been shown the rules before starting each practice. He was very distraught by his lack of success and went back to the example, to try and find out what was going on. He also did not follow or see the instructions for the Type In task and still persisted in using 'le' as a possible answer. When hearing the 'Boing', he realised his mistake, but used 'le' again in the last question.

The experimenter then explained that the next set of exercises this time would include the three determiners, and he made 5/10 errors in MC4 on questions 1, 2, 4, 8 and 10,

*[1) la poisson, 2) la, le ours, 4) la chat, 8) le girafe, 10) le panthère ],*

and 2/10 errors only in FI4 on questions 4 and 6:

*[4) la rhinocéros, 6) le, l' chouette].*

This shows that he got most of the answers correct for the elision rule, but found it more difficult to assign or remember the gender of words.

Again, he was very vocal, sniffed and sighed during the exercises, cursed the mouse and was obviously getting upset at not getting it right. After being advised to do more practice by the experimenter, though he could always stop if he got fed up, Brandon finished with 4/10 errors in each of the exercises, on questions 1, 4, 6 and 7 for MC5:

*[1) le chouette, 4) le, la écureuil, 6) le hirondelle, 7) le grenouille],*

and 1, 3, 5 and 6 in FI5:

*[1) la singe, 3) le girafe, 5) le, la ours, 6) le panthère.]*

His answers were becoming more inconsistent, as more errors occurred even on the elision rule and he appeared not to have learnt much. He was still heavy on the keys, but took heart, knowing that the end the session was near. He nevertheless decided to consult a few

of the global revision cards and did better in the post test with 7/10 , with just three errors on questions 3, 5 and 6, all gender errors.

**[3) la cochon, 5) le girafe, 6) le grenouille.]**

He had improved his score but did not appear to have learnt very much, even though he had been shown the rules. He was able to state some of the rules in the subsequent interview and declared that 'l' ' came before 'h', 'a' and 'o's. However, he also thought that 'le' came mainly in front of words starting with 'l' and 'c's and 'that la' went with words that sometimes started with 'c', 's' or 'g's.

He had abandoned the original rules stated after the pre test, suggesting that the rules he had stated could be considered, not so much as regular rules, but more as rationalisations prompted by the interview. Instead he had concentrated on the beginning letters of words, which was fine for applying the elision rule, but did not help him determine the gender of the words, in spite of all the clues given. His focus on 'initial' letters to assign gender might be due to the success of his strategy for 'l' 's. This may be a danger for a learner who is not paying too much attention to the rules. Perhaps another teaching strategy would have been more beneficial to him or he simply could have done with more structured practice on gender. This may explain his inconsistencies on the elision rule and his inability to correctly assign gender to many of the words, even though they had appeared a few times.

He also said that he knew it all before and admitted he had not paid great attention to the examples or read the explanations very carefully. This feeling of familiarity and over confidence might have led him not to pay too much attention to the explanations offered. Nevertheless, his impression of the program was favourable: he found it "good for learning".

From this example we can conclude that providing the rules does not necessarily help the learner apply them. Some learners do not necessarily pay attention to the rules, or perhaps do not understand them. They may use the wrong feature on which to base their application. The rules may also be difficult to apply and require a number of procedural exercises in which the learners have ample opportunities to practice their application. More subtle strategies may have to be devised. For this learner, the explicit mode as implemented, was not able to overcome his lack of attention.

**b) Contraction in the exploratory mode:**

Brandon's next session, contraction in the exploratory mode, took place a month later and lasted 53 minutes. He was briefed about the options provided and the desirability to give a reason for giving a particular answer, Brandon did the pre test, in a more relaxed manner and volunteered information freely.

He got 4/10 in the pre test, with errors on questions 1, 2, 3, 5, 6 and 7:

- [1) le cou du cigogne, 2) la queue de la chien, 3) la tête du aigle,  
5) l' aile de la pingouin, 6) les pattes de la antilope,  
7) les poils de l' chameau].*

Brandon justified his answers by either saying that he knew some of the words already, or by muttering that ('de la' pingouin fitted, 'de l' ' came in front of the 'c', 's' normally comes after 'du'), or had guessed, if he did not know. He did not hesitate in any of his answers, was a bit disappointed about his score. When asked, he volunteered the following rules:

'du' came in front of 'p' and 's' words;

'de la' in front of 'a'; and

- 'de l' ' in front of 'h' and 'p',

which he corrected to 'c', when challenged about the inconsistency of his previous answer.

Again, we can see that the elision rule was not applied correctly in most cases, and that he persisted on using the wrong clues to make and test his hypotheses about the gender rules.

He was also asked about his experience of computers. He had an Amstrad at home, on which he did some word processing and normally played games, and had used Macs at school. Then he was shown the possible choices and options, the possibility of accessing the explanation and example at any stage, and the function of the back button, which allowed him to return to his place in the exercise.

Brandon went straight into the practice. In the first set of exercises, he tried out looking at the example and going back to the card successfully. He made 5 errors in the first exercise (MC1), on items 2, 3, 6, 8 and 10 (errors again appear light and underlined):

*[le cou: 1) du rhino 2) du panthère, 3) de la chameau,  
4) du pélican, 5) de la cigogne ],*

and 7 in the Type In exercise (FI1), on items 1, 2, 3, 4, 6, 7 and 10:

*[1) le cou de la chameau, 2) la queue du la vipère, 3) le cou du girafe,  
4) le cou de l'le la héron, 6) la queue de la chien, 7) le cou de la pélican,  
10) le cou du cigogne ].*

Again, we can see that he still was not be able to remember or assign the correct gender to these nouns. He still met with practical difficulties, because the keyboard had a different lay out from his. He also made comments that the " 'c' did not work", and that " 'de la' did not go before a 'c' ". At the end, he said that "sometimes 'de la' went before the 'c' and sometimes not", thereby questioning his own hypotheses. The experimenter then pointed out that the black boxes might give him a clue, as he appeared not to have noticed them.

This shows that learners do not necessarily pick up on clues provided to assist them. Moreover, many examples may be needed: once a learner has started on the wrong hypothesis, or looks at the wrong clues, it is difficult to provide sufficient negative evidence to help him/her modify or abandon his/her inappropriate course. Discovery of the rule is not always easy and might require a variable number of examples. Guidance about the important clues to make the correct hypotheses might be necessary. The second practice did not lead him to revise his hypotheses, as he still thought that 'de la' occurred mostly after the 'c's.

In the next exercise (MC2), he made 2 errors on questions 4 and 10:

*[4) le bec de l' cygne, 10) l' aile de l' pélican.]*

He only made one error in the next, (MC3), involving 'de la' and 'de l' ', on question 9:

*[9) la tête de l' grenouille.]*

This sounded very promising. Perhaps he was starting to learn something. After these two practices, this time he stated the rules he had been using as:

'de l' ' came in front of the 'u, a, h' and 'du' in front of 'c, p's,  
and 'de la' in front of 'g's.

These were relatively consistent with the answers he had given in the previous two exercises, and explained some of his errors, with respect to the 'c' and 'g's. He was aware that some of his rules were not working, because of the error signals. He then consulted the explanation and mentioned the 'a, i, o, u' s and added that 'a' went with 'de la', 'i' with 'de l' ' and 'du' with 'o's.

There was strong evidence that, even having read the explanation, he had again, either not grasped it, nor assimilated the details it contained, or simply decided to ignore it because of his original strong bias to concentrate on the beginning of words.

In the next MCQ, 4, which mixes all the rules and the words, he made six errors, on questions 1, 3, 4, 5, 7, 8:

- [1) les oreilles de la antilope, 3) l'oreille de l' girafe,  
4) les oreilles du/de l' hyène, 5) les oreilles de l' hibou,  
7) les pattes de l'/du héron, 8) les pattes de l' cygne.].*

This led Brandon to revise his hypothesis to " 'a' goes with 'de l' ' ", which was correct.

He next decided to miss out on the last practice, consult revision cards and went on straight after to do the post test, in which he got the same score as in the pre-test, 4/10, after hesitating on 4, with the following answers:

- [1) le cou du cigogne, 2) la queue du chien, 3) la tête du aigle,  
4) les yeux de l'/du hibou, 5) l'aile de l'/de la pingouin,  
6) les pattes du antilope, 7) les poils de la chameau, 8) la tête de l' hyène,  
9) les yeux de la souris, 10) le bec du pélican.]*

As he was doing the test, he commented again on the 'h, p, c, s's, said he remembered some. He was surprised to get such a low score and when asked what he had learnt or discovered, he talked about the 'h', 'a', as one of the possible causes of his low performance. 'Du' came in front of 'h, c's, 'de la' came in front of 'a, s's and 'de l' ' in front of the 'v', sometimes 'p's. He was then challenged about his rules by going through one or two selected examples and being shown the rules.

As far as his memories of the first session were concerned, he remembered that 'le' was masculine, 'la' feminine, that last time 'le' went in front of 'h' and 'c's, but that this time the 'h's did not work. He finally realised what the function of the little boxes was. What had been quite confusing for him, was the fact that some of his guesses were correct, as some



of the words beginning with 'h' were to be treated as consonants because the 'h's were not silent.

During the whole of the session, Brandon had hardly consulted the rules, except very late into the practice. We also remember he had not paid much attention to the rules, even in the explicit mode. Therefore, this exploratory session was much more like an implicit one. His performance in this module was worse than in the elision module, done in the explicit mode.

However, his main problem was that he still seemed to persist in linking the beginning of the nouns with their genders. Unfortunately he also did not realize the function of the highlighting, until after the post test. So, Brandon had carried on making hypotheses and trying to revise them in the light of negative evidence, but was concentrating on the wrong clues. Obviously, the highlighting had not worked for him and this module had failed to teach him anything.

When questioned about his preferences about the program, he added that he preferred to go next, i.e. to follow a preset path, that he did not like to go back, i.e. to interrupt the flow of the program to consult a utility such as the explanation or the examples. In spite of his dislike for exploration, he still liked this session best as it had taught him more. This is very important, because it suggests that this learner was unwilling to reflect, check or revise. Such a learner would be unlikely to devise a productive learning strategy for himself, and may very well need more directing. He seemed very willing to do another session soon, in spite of his lack of success.

c) Agreement in the implicit mode:

Brandon did the agreement module a week later and just spent 32 mns on it. He first started with the pre test, in which he got 6/10, with only 4 errors on questions 6, 7, 8, 10. Here is the list of his errors:

*[6) le lion a une gros tête, 7) le pingouin a un bec noirs,  
8) la coccinelle est petites, 10) la libellule a de long ailes.]*

He said he had guessed three of the answers, 1, 3 and 6, and that he knew the others. He was quite pleased to have scored better than in the last session and described the sort of clues he had used to answer the questions: '

- 'Longue', which meant long and thin sometimes came after the letters 'g, y, o, t',
- the adjective endings 't, n' came after 'n' and 'p's.

This showed that he still persisted on clues involving the initial letters of words, even for a different grammatical problem, and therefore would again be unlikely to learn very much. Perhaps these misconceptions needed to be challenged once identified. He also found the exercise confusing and a bit difficult to understand.

When the time came for the practices, he was given his implicit brief to find out the rules and work them out without any explanation. He then read the instructions aloud, then flew through all 5 of the MCQ exercises, leaving out all the type in ones, which he did not like, making the occasional comment on why he was giving a particular answer, all having to do with remembering things and the ending of the adjective and beginning of the next word.

He made 7 errors in MC1, the masculine/feminine part of the module, on questions 1, 3, 5, 6, 7, 8, 10:

- [1) le chien est petite, 3) la girafe est long, 5) le rhino est grosse,  
6) la panthère est noir, 7) l'hirondelle est petit,  
8) la chouette est gros, 10) le renard est longue.]*

4 errors in MC2, which deals with the concept of plural of the masculine forms, on items 2, 3, 4, 8:

- [2) les yeux de la grenouille sont grosses, 3) le cou de l'aigle est grosses,  
4) le bec du pingouin est petits, 8) les poils du chat sont noir.]*

There were also 3 errors in MC3, the feminine counterpart, on items 4, 5, 8:

- [4) les pattes du héron sont longue, 5) la corne du rhino est grosses  
8) les pattes du cygne sont grosse.]*

7 errors in MCQ 4, which practices the plural forms only, on questions 2, 3, 4, 5, 7, 8, 10:

- [2) les yeux du hibou sont noires, 3) les ailes de l'hirondelle sont noirs,  
4) les oreilles du lièvre sont grands, 5) les cornes du cerf sont longs,  
7) l'hippo a de petits oreilles, 8) les yeux de la chouette sont grands,  
10) le chameau a de gros bosses.]*

and 8 errors in MCS, which mixes up all four possibilities, on questions 1, 2, 4, 5, 6, 7, 8, 10:

- [1) l'anguille a une long/s queue, 2) le raton-laveur a les yeux noir/le,  
4) les bosses du chameau sont grosse, 5) le singe a de petite/les yeux.  
6) le bec du pingouin est petites/s/le. 7) le corps de l'hippo est grosses,  
8) le chat a une queue noir, 10) le papillon a de grand/s ailes.].*

He still was trying to understand the role of the black boxes, which he knew could help. At the end of the third exercise, he said he had worked something out but could not really explain it. His rules for the plural forms at the end of MC4 were expressed as 'es' for little, 'rs' for big and one other concerning the 'p'. He was still looking at the wrong clues, the ending of the adjectives. He was aware that some of his rules or principles did not work. However, he never appeared to be able to reformulate or restructure them successfully. He had no idea on how to change his hypotheses and would have needed a lot of help and training from the program to get back on the right track. This shows how dangerous an implicit mode can be, as the learner's misconceptions cannot be re-directed, if taught only implicitly.

In the last practice MC5, he commented that he knew some of the answers (2, 3, 9), guessed on one and added that the boxes gave some clues about the letters. By this time, he did not want to do any more practice and chose to do the post test, for which he scored 2/10. The only two correct answers had also been correct in the pre test, 2 and 3. The errors he made are listed below:

- [1) la queue de la panthère est noir, 4) les oreilles de l'hippo sont petits,  
5) les poils du chat sont noir, 6) le lion a une grosses tête ,  
7) le pingouin a un bec noirs, 8) la coccinelle est petit ,  
9) les pattes de la souris sont noirs, 10) la libellule a de long ailes.]*

His last comments on the rules were:

- 'n' goes in front of 'c', '
- ir' in front of 'q', 'c', and 't's,
- and 'es' went mostly with 'p's.

As in the other modules, he had not learnt anything at all and was still persisting in concentrating on the wrong clues, never mind how many hints and challenges he was faced with. This module seemed to have confused him, and shows that implicit teaching offers little to a student having difficulty.

This implicit mode was surprisingly the one he preferred overall, as he had found it "a bit harder", and it was "teaching more than the last one". He had very little sense of the progress he was actually making and was mistaken about his achievement, as he had not learnt anything yet. When asked he also acquiesced that he preferred finding out things for himself. His next preference went to the exploratory mode.

#### d) Lessons learnt form Brandon's case:

None of the modules of the program had worked successfully for this learner. The only rule on which he improved temporarily was the elision rule, which he said he already knew and had done in class. However, his relative success in the elision module, done in the explicit mode, led him to over generalise the triggering features of that rule, the initial letter of nouns to gender assignment. He made no distinction between the two and failed to understand or follow any of the clues given by the program. Not surprisingly, he did very badly in the other two modes. He used the exploratory mode as an implicit one and took little notice of any explanations or hints. It was therefore difficult to see how this learner could be helped. He did not like looking at rules and preferred to find out for himself, but was obviously very unsuccessful at making the right inferences.

### **5.3. Conclusions and Implications:**

From the two detailed case studies, which show a wide range of variation in the effectiveness of the features provided in the program, it was not only possible to extract

some principles that might improve the design and facilities of the program, but also to improve the teaching of the concept of gender assignment and agreement in French and to start answering our original research questions.

### **5.3.1. Lessons drawn for the design of the program:**

As far as the design was concerned, Shanice was on the whole comfortable with the program, reasonably happy with the facilities and clues provided and able to make good use of them. Brandon, however, had difficulties in using both the mouse and the keyboard, which suggests that he lacked computer training. He also found it hard to type and therefore missed out most of the Type In exercises, and some valuable tuition. This is also very important as many learners lacking computer skills shied away from the type in exercises.

He also had problems reading and following instructions, often asking for clarification. which suggests that a demonstration or a simulated example might work better than a series of instructions, which can be misinterpreted.

Brandon was also puzzled by the use of the buttons and facilities offered, the highlighting, provided as a clue to the gender of the words on which the questions hinged and designed to attract the learners' attention to the relevant dependency. It may therefore be necessary to explain or demonstrate the function of the clues to the learners, so that they can fully benefit from them.

Moreover, he also found it difficult to move around the program, especially in the exploratory mode, in which he constantly wanted to know what to do. This suggests that some of the learners might benefit from advice about whether or not to attempt some

additional practices, based on their scores in the practice exercises and the number and nature of errors encountered.

The fact that Brandon constantly wanted to know his score even in the practices suggests that this feature may be of benefit in a future redesign. Therefore, we suggest a continual display of the score, to allow the learner to self-monitor, as in most computer games, as these are more oriented towards the extrinsic value of the session, (a high score), than its intrinsic value (learning French). A design that would enable such learners to learn French as a by-product of scoring well in a game would probably be more successful.

### **5.3.2. Lessons drawn for the pedagogical design:**

Shanice was obviously a very good learner, unfamiliar with the topics covered, who only had to look at examples and explanations once to find out what was going on. The second part of the program shows that Shanice was extremely good at inferring from previously acquired knowledge, as she was able to extend the principles worked out in the first module to this part.

However, there were still problems experienced even by this good learner. She had difficulties in classifying 'h's, which suggests that a sound facility might have helped her work out the difference. It was also clear that after the elision module, she might need more reinforcement or practice on the gender of words to make the full connection between the 'un' and 'le' and the 'une' and 'la' and vice-versa, which might still cause her further problems. Her hesitation and comments in the post-test interview predict her difficulties with the agreement module. One suggestion would be to focus the content of the program more on the structure of the sentences, to develop in the learners a greater awareness of the dependency relationships between nouns and adjectives in the sentence.

In the third part of the program, Shanice also had problems in identifying the noun agreeing in gender and number with the adjective. Therefore wrong answers were given whenever there was a conflict between the genders and numbers of the nouns denoting the animal and the part of the body, caused by the purposely built in diversity of the sentence structures in the exercises. This may demonstrate the need to make the exercises more adaptive and to add exercises in which the learners would have to match the noun and its adjective. Even the explanations provided did not always help this good learner.

Brandon seemed to have covered the topic and to be somewhat familiar with some of the vocabulary used. He had some previous ideas about the vowels and 'h's, even though he could not formulate them very clearly. Brandon also seemed either not to read the explanations very carefully or not to understand them. He rarely consulted them when given the choice. This suggests that the explanations could be redesigned and revamped to attract the learners' attention more, or that learners could be reminded of their availability at key stages of the program.

The problems experienced by Brandon in re-formulating and revising his hypotheses show that learners may ignore negative evidence for a long time. Brandon's case also reveals that learners can look at the wrong features and keep looking unsuccessfully at the wrong clues. This was hoped to be pre-empted by the addition of highlighting features linking the nouns and their determiners in the elision and contraction module, and, when possible, the adjective and the matching determiner or noun in the agreement module. However, Brandon failed to make the connection between the words highlighted, and their relevant match. Shanice also had experienced problems in identifying the relevant links.

From Brandon's performance and records in the contraction module, we see how difficult it can be to amass enough contradictory evidence to cause the learners to change their



misconceptions. Different strategies will have to be adopted and tested to try and alter these misconceptions. However, we have also demonstrated that it is not always possible to determine the source of the misconceptions, unless the learner is asked to formulate his/her rules or we go back and ask them how they have arrived at particular answers. It may also be possible to structure the linguistic content of the questions so that we can test our predictions about their likely misconceptions.

### **5.3.3. Comparison of the three teaching strategies:**

These two detailed case studies also provide an opportunity for a comparison of the three modes investigated in terms of efficiency, and of the preferences expressed by the learners, as in the original research questions which concerned:

- (i) the workability of implicit teaching,
- (ii) the effectiveness of explicit statement of the rules of language for the learner,
- (iii) the value of the 'exploratory' approach, and,
- (iv) the preferences expressed by the learners.

(i) Implicit teaching can work very well, as in the case of Shanice, who was able to make the necessary inferences and connections successfully. However, implicit teaching did very little to challenge or correct the misconceptions entertained by our less successful learner, Brandon. This shows how dangerous it could be to leave the learners to their own devices and leave them to work out the right rules and connections for themselves, without any guidance, especially when the topic involved is more difficult, as in the case of the agreement module, which caused more problems, even to successful learners.

(ii) Explicit statement of the rules was only partly successful for Shanice, even when working in the explicit mode. The explicit mode was not very successful for Brandon, as he paid little attention to the explanations provided, and because he thought that the topic

was familiar and therefore did not need much work and concentration. Perhaps, the explanations were not at the right level, and will need revising. We have also highlighted the need to make the structure of the sentences involved more transparent, which may involve teaching other items first, i.e. the concept of possession and word order in the noun phrase. This shows that providing the rules does not solve all the problems, even for a very good learner. In some cases it might be necessary to work more explicitly on the conditions in which the rules apply and to provide more structured procedural exercises.

(iii) As far as the exploratory mode is concerned, it worked very well for Shanice, who was able to make good use of the explanations and facilities offered by the program. Perhaps part of her success in that mode might be due to the greater simplicity of the topic and to the fact that she used it initially more like an explicit mode, consulting the global explanation first and looking at a couple of examples, before moving on to the exercises. Brandon's strategy was different. He preferred to be more active and to find out things for himself, and therefore, when working in the exploratory mode, he felt overwhelmed by the multiplicity of choices offered and did not make use of the explanations and examples available, until later in the program. This problem might be alleviated by offering a guided tour of the possibilities offered in the exploratory mode.

(iv) Shanice preferred the implicit mode, which had worked very well for her. She had found it more interesting, more challenging to guess and to work out things for herself. She also enjoyed the exploratory mode, which she originally used as an explicit one, consulting the global explanation first, then a few examples, before moving on to the exercises. She had done equally well in both these modules.

Brandon liked to be told what to do, to follow a definite path, to have a feeling of achievement. He preferred exercises to be hard, liked challenge and discovery, and for this

reason, had preferred the implicit mode, even though paradoxically, it was the one in which he had been the least successful. His next vote went to the exploratory mode, which he had used as an implicit one, only consulting the explanations twice, very late in the module. We also recall that he paid very little notice to the explanations, even in the explicit mode.

This may mean that what the learners prefer to do may not be in their best interests and that teaching strategies which seem to offer a considerable amount of freedom might also need to be more structured and more adaptive to the learners' needs.

#### **5.3.4. Conclusion:**

Brandon was not alone in this sample in liking to be successful, in preferring to do something harder, and in following the wrong clues persistently for a considerable period of time. It seems at first very difficult to suggest what could possibly be done to help such learners. Appropriate strategies include re-structuring the exercises and the content of the program to minimize the possibility of misunderstanding and misconceptions and including or improving the program help features.

- i) It might be advisable to structure the exercises more, to raise greater awareness in the learners of the sentence structures and the dependency relationships between nouns and adjectives.
- ii) Moreover, if strategies can be devised to successfully test possible misconceptions in the exercises, then the program could be redesigned to challenge these errors and misconceptions and to try and to get the learner back on to the right path.

Moreover, as some of the program features were not always transparent and could be found to mislead the learner, it would also be beneficial to:

- iii) include an animated demonstration for each mode, providing one or two examples, just to get the learners familiar with the program facilities and the available help features before starting the exercises;
- iv) provide differentiated advice as to which path to navigate, according to the learners' pattern of errors and misconceptions detected;
- v) include some incentives and an optional scoring facility in the exercises to train the learner to monitor his/her own progress;
- vi) use highlighting and any other attention seeking devices sparingly, as these can mislead rather than help the learner, and/or make their function more transparent.

Apart from giving us the opportunity to critically evaluate the program designed, looking in detail at a few examples also gives us a framework to approach the presentation and analysis of the results of the experiment we had undertaken. The records collected have allowed us to perform an analysis of the data, both in qualitative and quantitative terms. These records may also give us the opportunity to construct learners profiles, to identify types of good learners and less successful ones, to devise a success measure for the program to compare the performance of each mode, to identify misconceptions and problems and attempt to explain them as will be demonstrated in the analysis sections, chapters 6 and 7.

## **6. ANALYSIS OF EXPERIMENTAL DATA:**

This chapter describes the process of analysis of the records obtained during the series of the three computer and interview sessions described in detail in Chapter 5, i.e. the manual notes, the audio tapes, the computer records and the interview data for the sample as a whole. 6.1 consists of a quantitative analysis of the performance of the learners in the pre and post tests in each of the program modes, and how individual profiles can be constructed for each learner from the data gathered. 6.2 shows how the quantitative results were compiled and obtained and the calculations performed, before proceeding to the analysis and interpretation of the learners' errors and problems in 6.3. Then the conclusions reached are drawn in terms of the comparison of the three teaching strategies, implicit, explicit and exploratory, answering the questions set in Chapter 5.

### **6.1. Compilation of Results for Analysis:**

The quantitative records obtained and described in the previous chapter (test scores, practice answers), were collated and analysed and a formula was tentatively devised to measure the success of the program and to allow comparisons between individuals, groups and teaching modes. Further, individual results and answers can be presented as a quantitative profile across all the three modules for each individual. In this section, we show how a defined measure, the improvement measure, provides a quantitative analysis of the results of both individuals and groups of learners. We also explain how the individual learner profiles were constructed.

#### **6.1.1. The Improvement Measure (IM).**

In order to be able to answer the research questions concerning the effectiveness of implicit teaching and its comparability to explicit and exploratory learning in a computer

environment, as set in Chapters 4 and 5, it was necessary to compare the efficiency of the program in each of the three modes implemented. To achieve this, we needed to quantify in some form the success of the program. This is why the improvement measure (IM) was defined. It is calculated from the results obtained by each of the learners in the pre and post tests for each of the modules, allowing us to compare the improvement of their scores after working with the programs.

As each learner was to experience each of the modes in turn, the IM thus obtained could be used to compare the relative efficiency of each of the modes for each of the learners. Further, as we had defined groups of learners in Chapter 5 (X, Y and Z), grouping together learners who went through a particular sequence of the three modes, this also formed the basis of a global comparison between these learner groups.

In each of the modules, the learners' pre and post test answers were recorded on the computer record cards to give them feedback on their performance and to motivate them to improve their scores during the session on the computer. However, these simply indicated the number of correct answers given out of the possible total of correct answers, i.e. 10. The change in the pre and post test scores gave an initial indication of the range of improvement achieved by each of the modules. We needed a more sophisticated measure of their improvement and of the programs' success, taking into account the different starting points in the pre test. The initial formula for the improvement score was calculated in the following way:

$$\text{IMPROVEMENT SCORE} = \frac{\text{POST- PRESCORE}}{\text{INITIAL PRESCORE}}$$

(Actual Improvement)

(Initial Performance)

According to this formula, we obtained :

a change of score from 4  $\rightarrow$  5, an improvement of 25 %, i.e.,  $[(5-4)/4]$ .

a change from 8 to 10, the same improvement of 25%  $[(10 - 8)/8]$ .

a change from 4 to 8, an improvement of 100%  $[(8 - 4)/4]$ .

a change of 0  $\rightarrow$  4, an IM -  $\infty$ , [(4 - 0)/0] and

a change from 2 to 6, an improvement of 200 %. $[(6 - 2)/2]$ .

The improvement thus calculated did not provide an accurate measure of the success of the program, for several reasons. Learners who achieved a perfect score in the post test were starting from a wide range of pre scores, 0-9, and these figures did not faithfully represent the range of the improvement encountered. Some learners did not improve their scores, and some got worse results and the figure thus obtained was negative. Moreover, a learner starting in the pre test with a null score confronted us with the problem of dealing with an infinite improvement score, which seemed less than desirable.

Therefore, we had to consider alternatives to calculate the improvement measure: The program was designed to help the learners achieve mastery. Therefore, it seemed to make sense to measure the success of the program in terms of the ratio of actual to possible improvement, as the improvement in relation to the initial score was less important than the improvement in relation to the desired change in score. So the tougher test of the improvement measure, which we shall refer to as IM was devised. The new IM formula is then calculated according to the formula given below:

$$\text{IMPROVEMENT MEASURE} = \frac{\text{POSTSCORE} - \text{PRESCORE}}{\text{MAX POSS POSTSCORE} - \text{PRESCORE}}$$

With this new formula, the following IM scores are obtained, from a maximum score of 10:

15 % for a change of score from 4  $\rightarrow$  5 (1 / 6),

66 % for a change from 4  $\rightarrow$  8 (4 / 6),

40 % for a change from 0  $\rightarrow$  4 (4 / 10),

50 % for a change from 2  $\rightarrow$  6 (4 / 8), and

100 % for a change from 8  $\rightarrow$  10 (2 / 2).

Calculating the improvement measure in this way avoids the problem of infinite improvement scores obtained for some of the learners, which actually occurred in three cases. These three learners had scored 0 in the pre test and 10 in the post test, which gave them a score of  $\infty$ , with the original improvement score formula used, and 100% with the improvement measure. Once this IM was established and checked for meaningfulness, it was therefore possible to move on to the calculations and the processing of the data.

#### **6.1.2. The learner profiles:**

The pre and post test scores given to the children as an indication of their performance with the program still did not, however, reveal much about the internal state of the knowledge of the learners, i.e. their Interlanguage, the set of the rules they had constructed to give their answers. Once the improvement measure was obtained for each learner in each of the three modules concerned, in a different mode, it was then felt desirable to construct a dynamic profile for each learner to chart his/her progress at the end of each interaction for each rule concerned. However, further manipulation of the test results thus obtained appeared necessary. By looking closely at the actual answers given in the pre and post tests and the errors made on particular items, an improvement measure for each of the rules involved in a particular module was also worked out. In the elision module, it was



possible to obtain an improvement measure for the learners' knowledge of the elision rule and of their gender system for French. In the contraction module, again, the elision rule was involved as well as their knowledge of the French gender system, and that of the contraction rule. In the agreement module, the rules concerned were the gender agreement rule and the number agreement rules.

Each rule involved required a different triggering feature. Therefore it was possible to compile an improvement measure for each of the triggering features, the starting letters, the gender and number of the words. The gender feature was relevant in all the three modules, the initial letter in both the elision and contraction modules and the number feature appeared only in the last module, the agreement module.

It was therefore possible, in the elision module, to score each of the learner's answers first of all in respect of the correct application of the elision rule, then in terms of the correct gender assignment to the word tested. By correct application of the elision rule is meant a positive score of 1 attributed to the learner for each time the rule of elision was correctly applied to words starting with a vowel or a silent 'h' and a null score for incorrect application, i.e. failure to apply the rule to a word starting with the appropriate letter, or applying the elision rule to a word starting with a consonant, to which the rule should not apply.

### **6.1.3. The 'Item Score':**

Having scored the answers for the elision rule, a score was then given for each answer with respect to correct assignment of gender. This new scoring procedure had to take into account the previous rule, for if the learners had applied the elision rule, then we are unable to ascertain whether they could correctly assign gender, as this rule is independent of gender. On the other hand, if the learner had not applied the elision rule, then he/she

had to assign gender, and this could be done correctly or incorrectly. The 'item score' represented the global score for the answer, which both the gender and elision rules had to be applied correctly. Therefore, if one of the component score was '0', then the 'item score' was also nil. An example from one of the learners, (Shanice) will illustrate the scoring procedure for each of the rules involved, elision and gender assignment taken from fig 6.1. below.

<u>ELISION PRE TEST</u>						<u>ELISION POST TEST</u>			
	<u>ITEMS:</u>	<u>ANS</u>	<u>E</u>	<u>G</u>	<u>IS</u>	<u>ANS</u>	<u>E</u>	<u>G</u>	<u>IS</u>
1	anguille	le	0	0	0	l'	1		1
2	chameau	le, la	1	0	0	le	1	1	1
3	cochon	le	1	1	1	la	1	1	0
4	écureuil	la, le	0	0	0	l'	1		1
5	girafe	le	1	0	0	la	1	1	1
6	grenouille	l'	0		0	la	1	1	1
7	hirondelle	le'	0	0	0	l'	1		1
8	lion	l'	0		0	le	1	1	1
9	ours	l'	1	-	1	l'	1		1
10	singe	la	1	0	0	le	1	1	1
	_____		—	—	—				
	TOTALS		4/10	1/7	2/10		10	6/6	10

*fig 6.1. Pre and Post test scores for one learner on the Elision module.*

In question 1, our sample learner gives 'le' as her answer for the determiner preceding the word 'anguille'. From this answer, we deduce that she has incorrectly applied the elision rule, as the word starts with a vowel, and assigned gender incorrectly, and therefore this gives her a score of 0 for elision and 0 for correct gender assignment and an item score of 0 for that question.

In question 2, our learner revises her original answer from 'le' to 'la', which indicates that the elision rule is applied correctly, but the wrong gender is assigned to the word 'chameau' and she scores 1 for elision, 0 for gender assignment and 0 for the item score.

In question 9, involving the word 'ours' which starts with a vowel, the learner gives 'l' ' as her answer, which demonstrates correct application of the elision rule, but nothing can be inferred about his ability to assign gender correctly. This answer would be then scored as 1 for elision (E) and '-' for gender assignment (G), with an item score (IS) of 1.

The same scoring procedure is followed for the contraction module, where the elision rule is the first to be assessed and scored, as it should have priority over the other rules, followed by the gender assignment rule, from which application of the contraction rule derives, 'du' being associated with the masculine forms only.

<u>CONTRACTION PRE TEST</u>							<u>CONTRACTION POST TEST</u>						
	<u>ITEMS</u>	<u>ANS</u>	E	G	C	IS		<u>ANS</u>	E	G	C	IS	
1	cigogne	<i>du</i>	1	0	0	0		<i>du</i>	1	0	1	0	
2	chien	<i>de la</i>	1	0	1	0		<i>du</i>	1	1	1	1	
3	aigle	<i>du</i>	0	1	1	0		<i>du</i>	0	1	0	0	
4	hyène	<i>de l'</i>	1	-	-	1		<i>de l'</i>	1	-	-	1	
5	pingouin	<i>de la</i>	1	0	0	0		<i>de l', de la</i>	1	0	0	0	
6	antilope	<i>de la</i>	0	1	1	0		<i>du</i>	0	0	0	0	
7	chameau	<i>de l'</i>	0	-	-	0		<i>de la</i>	1	0	0	0	
8	hibou	<i>du</i>	1	1	1	1		<i>de l', du</i>	1	1	1	1	
9	souris	<i>de la</i>	1	1	1	1		<i>de la</i>	1	1	1	1	
10	pélican	<i>du</i>	1	1	1	1		<i>de la</i>	1	0	0	0	
	—	—	—	—	—	—		—	—	—	—	—	
	TOTALS		7	5/8	5/8	4			8	4/9	4	4	

fig 6.2. Pre and post test scores for one learner in the Contraction module.

Following fig 6.2. (showing Brandon's scores), for a typical answer such as 'de la' matched to the word 'chien' in question 2, our sample learner would score 1 for the elision rule, as it should not apply, 0 for gender assignment, as the determiner of the incorrect gender is used and 1 for contraction, which should not apply if the learner believes that the word is feminine. This would give him an item score of 0, as his answer is incorrect.

The same learner also answered 'du' for the word 'aigle' in question 3, which starts with a vowel and should follow the elision rule. The learner's score, in that instance, would be, 0 for elision, 1 for gender assignment and contraction, and 0 for the 'item score', as the learner has assigned the correct gender to the word and masculine words do normally follow the rule of contraction.

In question 7, however, the learner would score 0 for elision, wrongly applied, ' ' for gender assignment, from which we cannot draw any conclusions, ' ' for contraction, for the same reason, and 0 as his item score.

In the adjective agreement module, the two rules of gender and number assignment do not influence each other as far as their application is concerned and therefore the scoring is simple and independent and there is no need for an example: The learners either have got it right or wrong according to the form they chose.

Once the improvement measures had been compiled and calculated for each student, each module and each mode, it was then possible to construct a learner profile showing the starting score for the rules involved in each of the modules, followed by the end score and accompanied by the improvement measure calculated for each rule. We then can check whether the learner has regressed in the next session or maintained or improved his gains. improvement measures can also be compared across rules and across modules, providing an anchor on which our original research questions can be assessed.

An example of such a profile is charted in fig 6.3. below:

MODULES:	ELISION			CONTRACTION			AGREEMENT		
Rules:	Pre	Post	% IM	Pre	Post	IM	Pre	Post	IM
ELISION	60	100	100	70	80	33			
GENDER	50	50	0	75	67	32	70	60	33
CONTRACTION				60	50	20			
NUMBER							80	40	200

*fig 6.3. Scores on Component Rules for one pupil ( Brandon).*

This shows the score of an individual learner for each of the rules involved, shown vertically, i.e. with elision, gender agreement, contraction and number agreement scored as they occur across the three practices, shown horizontally. The first figure in each of the three columns shows the pre score, the second the post-score, calculated in the manner explained and the improvement measure in the third column.

For this particular learner, in the elision module (done in the explicit mode), he/she had achieved 60 % in the pre test for the elision rule, 100 % in the post test, which makes an improvement measure of 100 %, 50 % initially in the pre test for the gender assignment rule, 50 % in the post test, which makes a null improvement measure for gender. Therefore, the program has achieved its objectives for the elision module, that of teaching the elision rule to the learner, but has failed to improve his knowledge of the French gender system.

For the contraction module, (done in the exploratory mode), we obtain 70% and 80 %, with an improvement measure of 33 % for the elision rule, 75 % and 67% in the pre and post tests respectively for gender assignment, and 60% and 50% for the contraction rule. This shows that in this module, in this mode, the program has not achieved its objectives for both the gender and the contraction rules.

For the agreement module, the learner scores 70 % in the pre test, 60 % in the post test and 33% for the improvement measure as far as gender is concerned, and 80 % in the pre test, 40 % in the post test and an improvement measure of 200 % for number agreement. This shows that the program has definitely failed to achieve its objectives for the current learner.

The improvement measures thus compiled, along with the individual profiles gave us a very good method of plotting, measuring and analysing the progress of individuals longitudinally across the three modules and the three modes. These, combined with detailed analysis of the interview records gave us clues about the learners' conscious knowledge of the rules involved in the module and the progress made by each of them in each of the modules in a particular mode, implicit, explicit or exploratory.

Once all the individual records and profiles were finished, it was then possible to analyse the success of the program for each particular rule, in each module, in each mode, by adding and averaging the various improvement measure figures. The results of these will appear in 6.2.

## **6.2 Results of the testing of the program.**

The main research question was to establish and prove the relative merits of three modes of interaction used in the design of our gender program, i.e. implicit, explicit and

exploratory. improvement measures were calculated for each learner, each rule in each module. We shall now consider the results of the calculations thus performed and the data obtained to answer our original research questions. The first to consider is whether there is any quantitative difference between the three possible modes of interaction for foreign language learning: implicit, explicit and exploratory. It was also possible to calculate the percentage of learners for which the program had been successful, the time taken for each practice in each mode, the number of questions covered in each of the exercises, and to consider the preferences expressed by the learners for one mode of interaction or another, to establish whether they had acquired the rules by the end of each session and to assess the misconceptions and problems encountered in each mode. The results of the testing of the program will be considered in terms of these factors.

#### **6.2.1. Comparison of the scores for the three modes:**

The first results to be considered are the scores of the learners and the percentages of improvement across modules and modes.

To demonstrate how the tables of results were compiled, I shall show an edited example taken from the results of the elision module for the 11 learners working in the explicit mode, with the scores for each rule and each item compiled and calculated as explained in 6.1.3.

From the results of each of the individual rule and item profiles, a table was constructed representing the group results and including their pre test, post test scores for each of the rules and each of the items, as shown in fig 6.4. (the names used are the aliases chosen by the children themselves to preserve their anonymity).

Names	Elision			Gender			Item Scores		
IMPLICIT	Pre	Pst	IM	Pre	Pst	IM	Pre	Pst	IM
George	90	100	100	14	100	100	40	100	100
Barnes	100	70	30	50	100	50	70	70	
Michael	50	80	60	29	75	65	30	60	43
Jaron	10	90	89	66	40	76	10	60	56
Limpa	60	30	-75	57	43	33	40	20	33
Jane	90	100	100	89	100	100	80	100	100
Sarah	90	100	100	57	100	100	70	100	100
McDonald	70	90	67	57	40	-40	50	60	20
Sophie	70	100	100	57	67	23	60	80	50
Anything	80	90	50	25	100	100	40	90	83
Mary	30	100	100	80	100	100	30	100	100
AVERAGES:	67	86	58	53	79	55	47	76	55

*fig 6.4. Score results in percentages for the Elision Module in the Implicit Mode for group X*

Finally, the results for each column were totalled and averaged to obtain a group score for each rule, in the pre test, post test and for each item. This then gave a percentage figure for the improvement measure for the group of children exposed to the program in the implicit mode. If we look at fig 6.4. above, we see, that on average, the learners achieved 55 % improvement in the implicit mode for the elision module. These results can then be compared against those for the other two modes/groups compiled in exactly the same way, which are in Appendix D.

Figure 6.5. shows the average improvement measure (IM) for the item scores for the three modes (implicit, explicit, exploratory) for each module (elision, contraction, agreement).



In each case the group of children (X, Y or Z) doing the module in that mode is indicated in brackets, followed by the number of children in that group at the time.

Modes / Modules	Elision	Contraction	Agreement	Averages
IMPLICIT	55 (X:11)	60 (Z:10)	10 (Y:13)	39 (T:34)
EXPLICIT	20 (Y:11)	65 (X:10)	32 (Z:7)	39 (T:28)
EXPLORATORY	76 (Z:10)	57 (Y:12)	19 (X:8)	53 (T:30)
AVERAGES	50 (T:32)	60 (T:32)	18 (T:28)	43 (T:94)

*Fig 6.5. Average Improvement Measures for each mode, by module*

From these results we can see that, although all groups improve in all modes, they do so to differing degrees, and that there is an interaction between mode and content and mode and group. In spite of attempts to balance the groups, Y was the weakest group in each module and Z the best on nearly every module except contraction, when working in the implicit mode. Moreover, the improvements in the agreement module were also generally lower.

Therefore, it was felt desirable to normalise the results, to eliminate the differences due to difficulty of module content, by adjusting the scores to match those of the first module, elision. As the average IM on elision was 50, the average IMs of each group for the contraction module were decreased by 17%  $[(50-60)/60]$ , and those for the agreement module increased by 178%  $[(50-18)/18]$ , to give the following normalised IMs, as in fig. 6.6., with the raw scores, where applicable, indicated in brackets.

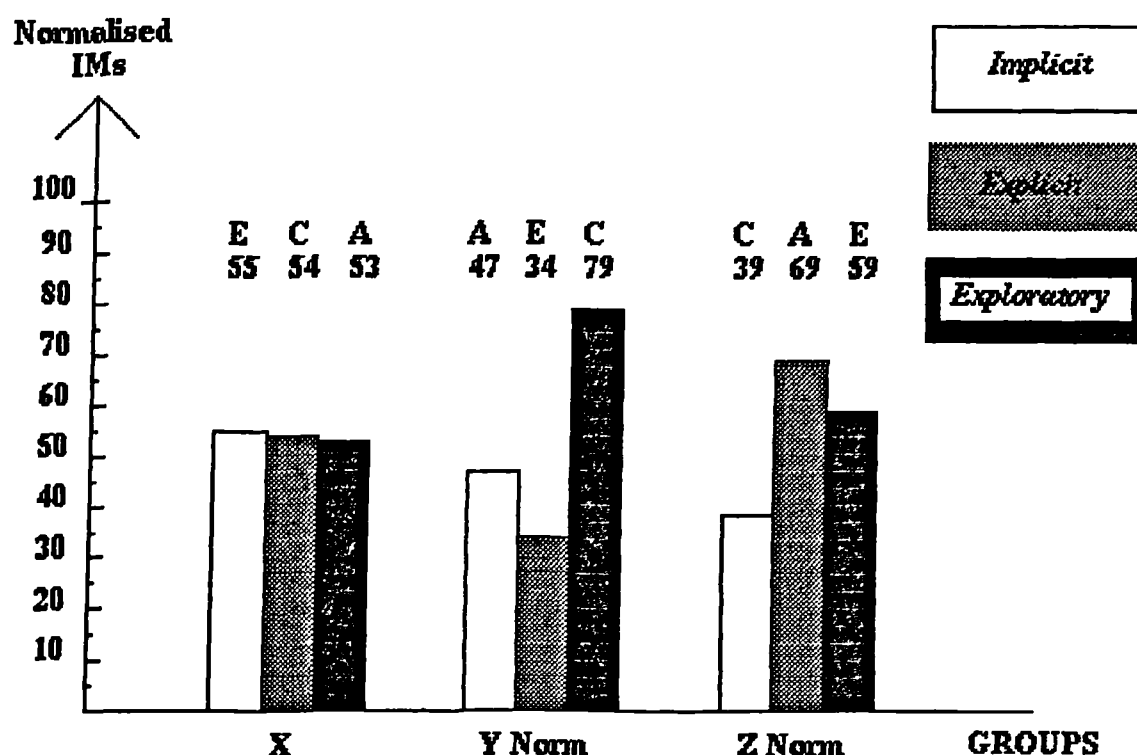
Modes / Modules	Elision	Contraction		Agreement		Averages	
		Norm	Raw	Norm	Raw	Norm	Raw
IMPLICIT	55	50	(60)	28	(10)	43	(39)
EXPLICIT	20	54	(65)	89	(32)	49	(39)
EXPLORATORY	76	47	(57)	53	(19)	58	(53)
AVERAGES	50	50	(60)	50	(18)	49	(43)

*Fig 6.6. IMs normalised on Elision module*

As groups were unequal, the results were also normalised on group X, the most constant and level of the groups, to minimize group differences. As the average IM for group X was 54%, the final normalised results were obtained by reducing the normalised scores of group Z by 23%  $[(70-54)/70]$ , and augmenting the normalised scores of group Y by 69%  $[(54-32)/32]$ . Fig. 6.7. shows the results in the form of a table and fig 6.8. represents the normalised results. graphically.

Modes / Modules	Group X	Group Y		Group Z		Averages	
		Norm	Raw	Norm	Raw	Norm	Raw
IMPLICIT	55	47	(28)	39	(50)	47	(43)
EXPLICIT	54	34	(20)	69	(89)	50	(49)
EXPLORATORY	53	79	(47)	59	(76)	65	(58)
AVERAGES	54	54	(32)	54	(70)	50	(50)

*Fig 6.7. IMs normalised on Elision module and group X*



*fig 6.8 Comparison of groups and modes after normalisation*

The ordering of the modes would then become, after normalisation on both module and group, implicit with a normalised average IM of 47%, then explicit, with 50% (normalised), and exploratory easily the best with 65% (normalised).

We can then conclude, that, across modes and modules, the exploratory mode outperforms the other two, by giving the best chances of success overall to the learners working in that mode, and that the implicit mode can disadvantage even a better group with a difficult topic. Results are on the whole better when learners have access to the rules, either in the explicit or exploratory mode.

### 6.2.2. Comparison in terms of the proportion of successful children.

Not all learners achieved a better score in the post tests, and some got worse scores. Success or failure could be linked to a given mode. Therefore the next step is to compare the proportion of successful learners, defined as the percentage of children whose scores improved from the post test to the pre test, for each of the modes in each of the modules, as shown in fig. 6.9.

MODES	Elision	Contraction	Agreement	Overall
IMPLICIT	82	90	62	71
EXPLICIT	73	90	86	83
EXPLORATORY..	90	75	63	75

*6.9. Percentage of successful learners in each of the modes and modules*

If we compare the individual performances of the 24 children having done all of the modes, we find 20/24 (83%) achieving some success in the explicit mode as compared with 18/24 (75%) successful in the exploratory mode and only 7/24 (71%) in the implicit mode. Overall, the explicit mode appears definitely better at getting more students successful. Moreover, in the agreement module, which is the most difficult, more children seem to be helped by the explicit mode.

The comparisons of the three modes in terms of improvement measures and of the proportion of children achieving some success with the program, i.e. improving their scores in the post test, lead us to conclude that more children achieve some kind of progress in the explicit mode than in the other two. The explicit mode gained an even bigger lead, the more difficult the module or the exercises are and the least able the

children are. Perhaps the less able learners were more reassured to work in a more transparent and highly structured set of exercises. On the other hand the exploratory mode, which scored the best on the improvement measure, allowed the successful learners to achieve the most significant learning gains and may be better suited to the more able learners.

### **6.2.3. Comparison in terms of the time taken to complete each of the modules in each of the three modes:**

As was mentioned in 6.1.6., the sessions were timed for each of the learners and the number of exercises done charted and tabulated in terms of the number of cards visited in the practice exercises for each session. The performances of the learners in terms of time taken to complete each of the modules can then be compared in terms of modes and within the groups themselves to see if any of the modes has any advantage over the others. The 'mode' results in fig 6.10 , represent the average time taken to complete a practice or series of exercises and the number of cards consulted on average for each group in each mode for that practice.

Modes	Implicit	Explicit	Exploratory
Practice Times	25'	24'	21'
Cards Seen	76	70	68

*fig 6.10. Average time taken per session and number of cards visited by learners overall.*

The learners spent similar times in practising all modes, but slightly less in the exploratory mode. The greatest number of cards visited was in the implicit mode. Therefore, the

exploratory mode appears more efficient not only in terms of improvement measure but also of the time taken and number of exercises. The implicit mode, on the other hand appears the least efficient, as it takes longer for the learners in that mode to complete the exercises and they have to do more exercises to achieve a generally lower improvement score.

#### **6.2.4. Comparison in terms of acquisition of conscious rule knowledge and misconceptions encountered:**

Since the design of the program originated from an analysis of learner's misconceptions, the most important comparison was to ascertain whether any of the three modes was better at helping the learners formulate correctly the grammatical rules and whether more misconceptions would be encouraged or created, in one of the modes. For this purpose, a table of the percentages of learners ignorant of the rules, having partial knowledge of the rules, and able to formulate the correct rules or entertaining misconceptions or formulating incorrect rules, was compiled for both the pre and post tests.

The average results across all modes, presented in fig 6.11., show that, before working with the program, 17% (4/24) made up incorrect rules or had misconceptions. Only 8 % (2/24) knew the correct rules and were able to formulate them. The others had either no knowledge or very limited knowledge of the rules.

However, if we consider the results for each of the modes, there are striking differences after the post tests interviews, as, in the implicit mode, the number of learners still formulating incorrect rules or entertaining misconceptions has increased from pre to post test, whereas for the learners working in the other two modes, it has remained the same. Furthermore, if we consider the percentage of children able to formulate the correct rules after the post tests, we find the implicit mode far behind with 27% (6/24), the explicit

mode with 46% (11/24) and the exploratory mode a long way ahead with 66% (16/24).

Rule Knowledge		Implicit	Explicit	Exploratory
<u>Pre test</u>				
	incorrect rules	17%	16%	17%
	correct rules	7%	8%	10%
<u>Post test</u>				
	incorrect rules	30%	16%	17%
	correct rules	27%	46%	66%
<u>Changes</u>	incorrect rules	+ 13%	—	—
	correct rules	+ 20%	+ 40%	+ 56 %

*fig 6.11. Correct/ incorrect rule formulation in the three modes in terms of student numbers*

This would indicate that the exploratory mode is more efficient at getting the learners to learn, recall and formulate the correct rules, whereas the implicit mode, in which the rules were not explicitly stated to the learners is by far the least efficient. This is another confirmation of the advantage of the exploratory mode.

Moreover, it would appear that explicit statement of the rules may also hinder the formulation of wrong hypotheses, as the only mode in which the percentage of incorrect rules increased was the implicit mode. The learners using the exploratory mode implicitly and never consulting the rules at all, also ended up worse off than the others, especially in the agreement module. Therefore the learners may be disadvantaged if they do not consult the rules when needed as this may lead to more misconceptions and incorrect hypotheses. Learners, irrespective of their abilities generally perform and learn better by having access

to an explicit formulation of the rules involved in the exercises and derive the greater benefit of these rules when allowed free access to these rules in the program.

#### **6.2.5. Comparison in terms of the preferences expressed by the learners for each of the modes:**

Another way to compare the modes is to look at the preferences expressed by the learners for a particular mode of interaction with the computer. As described in Chapter 5, learners were asked which of the sessions they preferred out of the three and their comments and opinions were recorded and scrutinised for the data analysis.

The data thus collected from the interviews allows us to determine whether any of the modes or modules generally proved more popular with any of the groups. Overall, the most liked module was the second one, contraction, with 14/24 (57%) of the learners' votes, followed quite a way behind by the elision module and then by the agreement module, both equal in terms of preferences, with 5/24 (21%) each. We can recall, that, on the whole, the contraction module was the one in which the learners were generally more successful. If we consider the preferences of the children overall, we then find out that the exploratory mode gets most learners' votes as their preferred module was done in the exploratory mode 11/24 (46%), followed by the explicit mode 8/24 (32%) and the implicit mode 5/24 (21%).

An analysis of the reasons the learners gave for preferring a part of the program to another leads us to establish a profile for each mode in terms of the learners' preferences and of their perceptions. The learners' comments could be roughly divided into 3 categories: enjoyment of the module, the learning process, and the learning outcome.



a) Learners' comments on 'Enjoyment':

The implicit mode was "fun", "enjoyable", interesting and generally enjoyed. For the explicit mode, comments about enjoyment were generally more muted. The exploratory mode was popular because of the "fun/ challenge factor", this feature of the program never received any negative comments: "good", "better", "more enjoyable", "more exciting".

b) Learners' comments on 'Process':

For the implicit mode, comments on process were also generally favourable. Quite a few children enjoyed guessing and finding things out for themselves, compared this mode to a puzzle or computer game and sometimes found it clever. "It's like a computer game in which you get killed", "I enjoyed guessing and working things out".

The explicit mode attracted more praise and children thought it "directed the learning more"; allowed "to work more independently", "taught you quicker" and that it was "better to work with explanations". The main criticisms were that some of the explanations were difficult to understand.

In the exploratory mode, most learners enjoyed more freedom of choice and being allowed to explore: "I prefer more freedom", "I enjoyed exploring", "it was fun to work things out for oneself". However, for some, this process was found to be quite trying and puzzling: These either found it difficult to make their own decisions, to navigate through the program, or ignored some vital exercises which failed to give them access to all the clues on all the rules.

c) Learners' comments on 'Learning outcome':

Generally, the learners working in the implicit mode did not rate the learning outcome for this mode as high as in the other modes. It was described as "harder", "more challenging", "not so clear". A few also rated it as "educational". The explicit mode was described as "educational" and "easier". Comments on the exploratory mode were generally very favourable in the elision and contraction modules, where it was also described as "educational", but far more criticisms were levelled at this mode in the agreement module, which was seen as "difficult, too difficult, hard to understand" and many learners felt that they "did not learn so much".

This would tend to demonstrate that the exploratory mode, which gives the learners more freedom and access to the explanations would be the preferred mode of operation for most, except for material that is unfamiliar or difficult. Some learners also greatly enjoy guessing and discovering for themselves, but on the whole find it harder, less efficient and prefer to have more guidance and explanations. Seldom is the explicit mode found more interesting or exciting, but some learners appear to prefer to work within a well defined framework in which they know what to do.

This suggests that different learners may benefit from different modes for different topics and that programs should be adaptive to what they appear to need. Particular attention should be given to helping the learners develop appropriate learning strategies and to guiding them into using all the facilities offered by the program to the full, especially when working in the exploratory mode.

#### **6.2.6. Global comparison/profiling of the three modes.**

Having compared the three modes, in terms of the improvement measures obtained by the learners, of the proportion of learners who were successful in improving their scores, of the time taken to complete a practice, of the number of questions answered in the exercises, of increased understanding of the grammatical rules and of the preferences expressed by the children, we arrived at the following profiles for each of the modes:

The exploratory mode appears to be the mode in which :

- the learners achieve the best improvement scores and in which most children achieved some kind of progress;
  - a higher percentage of learners managed to acquire the correct rules, and were able to state them;
  - a successful interaction took less time and required the least practice to achieve on average a better score;
- the learners generally placed their preferences, finding the learning challenging and fun, with a few reservations about learning and navigation strategies.

However, not all learners had the best chance of achieving success, especially those who tended to use the exploratory mode as implicit and hardly consulted the rules available.

At the other end of the spectrum, the implicit mode was :

- not the best in terms of improvement scores and learner preferences;
- more often the worst and most confusing for less able children, leading to fewer of them being successful;
- the mode in which the learners were less likely to learn to form the correct rules and hypotheses and more likely to entertain more misconceptions;

- the mode in which learners had to spend more time and to do more exercises for a poorer result.

The explicit mode came about half way between the two as the mode :

- in which more learners appeared to be successful in improving their scores;
- which gave better improvement scores than the implicit mode;
- which required the learners to do less practice and spend less time than in the implicit mode;
- that was second best for teaching the learners to remember and formulate the rules;
- and that was not often very high on the list of preferences, but appeared safer and reasonably efficient for the majority of learners, who had to read the rules.

This makes the exploratory mode preferable for teaching and exercising grammar rules and also suggests that its efficiency may be improved with more training in learning strategies and navigation strategies - perhaps guiding those learners who appear to need more guidance of the sort provided by the explicit mode and by advising these learners to consult the rules, especially when their results are poor in the practice exercises.

### **6.3. Problems encountered by the learners in their interaction with the program:**

We have alluded to some of the problems encountered by the learners learning in a particular mode, with the program and the exercises, in the case studies of Chapter 5 . These were not the only ones encountered, some being quite frequent, others more unusual. These particular problems were also listed and checked against the performance and session scripts for each learner. It appears useful at this stage to list most of the problems encountered so that solutions to these might be found in the future. Some had to do with the modes, others with the program and/or the use of computers, and others were

more connected with language learning and the concept of gender and gender agreement in French by native speakers of English. We shall now give a brief overlook of these problems.

### **6.3.1. Problems encountered with the modes:**

In the implicit mode, learners missed the explanations and generally found the modules confusing. Some did not look at the examples carefully enough and expected more guidance and tuition. Others could not remember the examples and had to be constantly reminded that they could go back to them. Moreover, some of the learners could not see a purpose in consulting the global revision cards provided at the end of each session. This may go some of the way towards explaining their lesser performance in this mode. Perhaps reading and browsing was too passive and introspective for this age range of learners.

While working in the implicit mode, learners suggested the following improvements to the program:

- a facility to be able to check the examples together, to be able to compare them;
- more time to practice, more exercises and a greater variety of exercises;
- more guidance or clues on specific problems, i.e. silent 'h's in the contraction module.
- pop-up error messages to help them monitor their own performance;
- more guidance about the instructions and the facilities available.

When working in the explicit mode, some learners did not understand the explanations, often because they did not or could not read them properly. Others could not remember the examples or explanations and forgot to use the facility to go back to them. Very little use was made of the local explanation facilities provided for each of the examples in this

mode. Those who had already worked in the implicit mode also missed the revision cards at the end of each set of exercises. Only a few suggestions were made for improving this mode, including making the explanations less complex and less confusing and offering more guidance on specific problems.

In the exploratory mode, quite a few found making decisions difficult and were not always aware of the navigation possibilities on offer. Quite a large number of learners (11/24) tended to use the exploratory mode as the implicit, preferring to see one or more examples first, while only a minority started from the explicit statement of the rule or part of the rule (8/24), and others proceeded immediately with the exercises (5/24). Many never availed themselves of all the facilities offered by the program, the examples (3/24), the explanations (9/24) and only a minority decided to do any revision (11/24). 2/24 went straight into the exercises and did not even consult any examples, explanations or revision cards and simply relied on the positive or negative feedback given by the exercises. When the freedom of choice was increased, in the agreement module, they often chose to miss out whole sets of exercises and therefore missed important steps in the teaching progression.

Generally, it was felt that they needed more guidance and training in availing themselves more fully of all the facilities provided by the program in this mode.

After their interactions with the program in this mode, some learners requested:

- a greater variety of exercises and examples;
- more freedom in the paths to be followed in the interaction;
- more guidance on the facilities and possibilities offered by the program;
- a strategy to simplify the decision process or greater guidance about their learning decisions.

### **6.3.2. Problems inherent to the program itself:**

Some of the problems also experienced by the learners stemmed from the use of computers and the general program design. These included :

- difficulties in using the mouse, with over enthusiastic clicking resulting on cards being jumped;

- problems with typing in words and using the keyboard, which required them to concentrate more on the process of typing and made the Typing In exercises less popular;

- lack of awareness of the function of buttons and other facilities and help features included in the program;

- confusion as to the purpose of the highlighting on most of the cards, provided as a clue to the meaning of the sentence for the example/questions;

- not noticing the highlighting included in some of the practice exercises to facilitate connections between the relevant elements of the sentence. (Not all learners failed to make the connection, some even thought the answers were given away by these clues and missed them when removed).

Some learners also made suggestions for improving individual modules. For the elision module the improvement they suggested, in addition to those already covered were:

- speeding up the program, as the recording of the paths for the exercises slowed it down considerably;

- making the program harder, and the exercises more challenging;

- being given more choice in the navigation of the program;

- adding colours for pictures and providing a greater selection of pictures.

Some of these suggestions were implemented in the subsequent modules, which were being designed at the time the elision module was being tested on the children. More pictures and examples were added to the contraction and agreement modules, and the rules were gradually made more complex to fulfil the wishes of the learners. The other features will have to be discussed in chapter 7.

The contraction module was generally the best liked and did not attract so many criticisms and suggestions for improvement. Learners called for more clues on the relevant features on which to focus, i.e. silent 'h's, which could have been provided by a sound facility perhaps.

The suggestions for improvement to the agreement module were again to:

- provide clearer examples and better explanation; and
- add the meaning of words or a facility for translation, as the learners were often confused by the variety of sentence structures used for this module.

These possible improvements will be discussed in the final chapter.

### **6.3.3. Learning problems encountered by the learners:**

Other problems encountered during the practice session with the programs originated from the complexity of language learning and of the rules we attempted to teach them. The most common learning problems included:

- not being able to read properly, therefore finding it difficult to follow the instructions and explanations provided;
- not understanding the instructions or explanations;
- lack of concentration and motivation, making them unable to remember the examples and/or explanations;



- being distracted by the help features (highlighting and black boxes);
- relying too much on memory and having to remember everything by heart, and therefore not making any hypotheses at all;
- being unable to remember the hypothesis they were in the process of testing.

These problems led them to misapply or misconstrue the rules: i.e. to over generalise the elision and contraction rules to gender assignment and agreement, with learners tending to focus on the beginning of words or the end of words exclusively; to associate particular determiners with certain orthographic features; to use semantic criteria inappropriately. The hypotheses formulated for each rule are listed below, grouped as in the initial and preliminary analyses, according to orthographic, morphological and semantic criteria and provide further confirmation of the misconceptions identified and thus of the importance of explicit teaching on these points:

Similarities in orthography between nouns and determiners, and/or adjectives led the learners again to form the following erroneous associations:

'Le' came with words ending in 'e', and words containing 'e' or 'es' or vowels.

'La' went with words containing 'a'; 'De la' was associated with words containing 'a's.

The necessity to focus on the initial letters for nouns to apply the elision rule also led other learners (e.g. Brandon) to assume incorrectly that these letters could also trigger the rules of gender assignment and agreement:

'la' was associated with words beginning with 'c, s or q's; 'de la' with words starting with the letters 'a and s';

'Du' was linked with words starting with 'p' and s's, 'h and c's;

'De l' ' was matched with words starting with the letters 'c, v and p'.

Some learners also vaguely remembered the adjective agreement rules and over generalised the conditions of application of these rules and/or confused them with gender assignment rules, leading to the following incorrect hypotheses:

- 'e' was the ending which came with words having 'le' in front of them;
- 'es' often came with words with 'les' nearby.

More unusual hypotheses involved the use of irrelevant semantic clues, i.e. the colour and shape of the words highlighted, or the part of the body highlighted on the picture:

- 'e' went with "quite big";
- 's' with things that were "only a bit black";
- and 'es' with "bigger words and black".

Though some of the incorrect hypotheses involved association with the wrong letter or feature, the wrong word in the sentence, and could be predicted, others were more difficult to explain or classify, and appeared more random:

- the masculine form of the adjective was associated with 'la', 'de l' ';
- 'l' came with feminine or plural nouns; 'es' was sometimes also associated with 'l's';
- 's' was sometimes linked with 'une' or 'la'.

Some of these misconceptions were very persistent, as witnessed in fig 6.11. There was a percentage of 16-17% of children, who came to the program with preconceived ideas or misconceptions and still entertained them at the end of the session, after the post test. None of the modes cracked the problem for the poorest learners. More of these tended to arise or persist if learners were working in the implicit mode or did not consult the explanations in the exploratory mode.

#### **6.4. Conclusion:**

The program in all modes generally achieved significant improvements for most learners, and therefore was often successful in raising the awareness of the learners about the concepts of gender assignment, and agreement in gender of determiners and adjectives with nouns, except for the poorer learners.

By comparing the three modes of interaction of the computer, we came to the conclusion that the exploratory mode appeared to be slightly superior to the other two. However, not all learners feel comfortable with this mode, as they experience difficulties in navigating through the program and making decisions. It was more suitable for more successful learners having more developed learning strategies, as they made better use of all the facilities offered by the program.

We also showed that the implicit mode seemed more likely to confuse the learners, especially the less able and to let them formulate more incorrect hypotheses, especially for the most difficult topic, agreement; it also was less efficient as it required more time and practice for a lesser gain.

We found the explicit mode to be the most successful in two of the topics, contraction and agreement, but slightly less efficient in terms of global improvement score, time and learning outcome, less challenging than the other two, but more reassuring and familiar to the less successful learners.

Moreover, the learners who used the exploratory mode as an implicit mode and did not consult the explanations also underachieved, particularly in the agreement module. This would tend to show that learners not encountering the rules are at a distinct disadvantage and to substantiate the necessity for some form of explicit formulation of the rules.

Finally, we investigated and attempted to analyse and classify the incorrect hypotheses formulated by the unsuccessful learners and found three main types of incorrect rules, either based on orthographical, morphological or semantic criteria, thereby mirroring and repeating the results of the initial and preliminary studies. Some suggestions about possible strategies to better help those poorer learners will be developed in Chapter 7.

## **7. DISCUSSION OF THE OVERALL RESULTS AND IMPLICATIONS FOR THEORY AND FURTHER RESEARCH.**

### **7.1. Outline of the thesis:**

In Chapter 1, we investigated and reviewed current theories of first and second language acquisition and asked whether the strategies and processes involved in language learning were identical in the two cases. As first languages are acquired implicitly, the role of formal instruction for the grammatical structures of the second language needed reassessing.

We explored mentalistic, behaviourist and cognitive models and discovered that far from being reduced to a simple process of imitation and repetition, language learning also involved the production and creation of learner specific rule-governed utterances, different from the adult input. There appeared to be definite acquisition sequences for a particular language. It also transpired that given the structural dependency of natural language, linguistic structure had to play an important role in language acquisition. The UG model used the framework of parameters and marked forms and features set in first language acquisition according to language specific settings, then reset or restructured in second language learning.

This model still lacked precision, elaboration and formalisation and much research was still needed to characterise it adequately (McLaughlin, 1987:95). We suggested that the UG model could be complemented by the learning processes identified in processing models such as the Competition model, describing language acquisition in terms of cue-driven learning, with languages varying as to the importance or weighting given to different cues.

Concentrating on the acquisition of syntax, we also investigated possible research methods in second language acquisition and critically analyzed the respective merits of contrastive analysis, error analysis and performance analysis, concluding that all had their own merits and something to offer for current research.

In Chapter 2, we investigated some of the teaching approaches used in the UK and examined the role given by these to the teaching of syntax and of the formal structures of the target language, in the light of the new National Curriculum recommendations and current classroom research. This led us to advocate consciousness raising of grammar rules as the preferred approach. Moreover, we also discovered the potential of the exploratory approach in this consciousness raising and showed that computers could contribute to greater learner autonomy. A critical evaluation of a selection of CALL programs and Artificial Intelligence developments led to the formulation of criteria for appropriate design features for CALL programs.

We also sketched a preliminary outline of the research question to be investigated, namely the comparative contribution of 3 different teaching strategies, implicit, explicit and exploratory, in raising the second language learners' awareness of the structures of the language they wished to acquire, which was to be tested with a computer program operating in those three modes.

The initial error analysis of Chapter 3 identified gender attribution and gender agreement as one of the most common problematic areas for the acquisition of French by English native speakers. The GCSE exam scripts had revealed difficulties in the application of most of the gender rules, especially the determiner-noun, adjective-noun agreement, vowel elision and preposition-determiner contraction rules. Moreover, learners appeared to experience considerable difficulties in combining these rules.

This error analysis was followed by a detailed study of the French gender system and an exploration of the possible problems to be encountered by learners in the acquisition of the French gender system, both for young native speakers of French and for second language learners, native speakers of English. This stressed the importance of morphology and of the grammatical context in the acquisition of both gender assignment and agreement. These revealed differences in the way the feature gender was being processed by these two groups of learners.

As most of the studies had been involving learners in an immersion setting, it was then felt necessary to investigate the problems encountered by second language learners in more formal settings, i.e. their errors, misconceptions and erroneous learning strategies, in order to inform and motivate the design of our experimental CALL program.

This led to a preliminary analysis, in which strategies to assign gender to unknown words, with or without a linguistic context were described and analyzed, and learners' ability to recognize gender errors was assessed. We wanted to find out whether learners could perceive easily the relevant features marking gender, whether a linguistic context would provide additional help and what kind of status they conferred on the gender features for nouns. For this purpose, several tests were carried out: a vocabulary learning test, a pattern recognition test, two gender assignment tests, one without a linguistic context and one with, and a grammaticality judgment task.

We confirmed that learners usually attempted to find general patterns in the grouping of the words they were presented with; used hypothesis testing and appeared to formulate their own rules, not necessarily consistent with the target rules, with varying degrees of consistency. The most common misconceptions entertained included the use of inappropriate orthographic or phonological characteristics or of semantics to determine

gender. Some learners were unable to deduce correct rules from examples only. All these problems had to be addressed.

This started to throw some doubt on the effectiveness of implicit teaching as the sole method to teach the grammar of a second language, as many learners formulated the wrong hypotheses if left to their own devices. Some learners arrived at the right conclusions more quickly than others, depending on features they focused on, meaning or form, whereas others did not appear to make any progress and looked unlikely to be able ever to arrive at the right rules unaided.

It was planned next to devise a computer program in which learners could practise at their own rates, exploring the merits of implicit, explicit and exploratory teaching of the grammar rules, with gender agreement in French selected as an appropriate domain.

In Chapter 4, we described the design and implementation of the computer program and formulated more precisely the questions to which the testing of the program would address itself: whether implicit teaching would work equally well for all learners, whether explicit teaching would be more efficient and how a version of the exploratory approach, in which the learners had access to the examples and grammar rules on demand, would compare with both. We were also interested to observe whether the better learners, would find it more attractive and challenging than the other two approaches. It was also important to discover how the learners who had not benefitted from implicit teaching would cope with an exploratory style of learning. Interviews with the learners about their preferences were therefore planned to allow us to compare these preferences with the results of the more formal tests and data collected.

The other line of investigation concerned the learners' linguistic systems (their 'Interlanguage') and the rules they would deduce from the linguistic material to which they



had been exposed. Following the results of the error analysis and of the preliminary study, it was decided that the set of problematic rules identified would provide a suitable linguistic framework from which to design, test and implement the computer program. This allowed the learners to work with the same material, on the same rule, but in a different mode, and to experience each of the modes in turn, before giving their comments and impressions on each of the modes. The selected rules were elision and determiner-noun agreement, which cannot be separated, for the first module, and contraction and adjective agreement for the last two.

A computer program, 'Itsicall' (Investigating teaching strategies in CALL) was then designed as three independent modules, called, elision, contraction and adjective agreement, to teach these rules, and all three modules were implemented in the three teaching modes, implicit, explicit and exploratory.

To carry out testing of the three teaching modes, it was necessary to have a basis for comparison of the different states of initial knowledge of the different learners, who came from different schools, and had been taught differently and therefore showed great variations in performance and initial knowledge. To judge the extent of the progress made by each learner, both individually and globally, identical pre and post tests were administered in each of the modules and each of the modes. The answers in both these tests were recorded by the computer, a manual record was also kept as a back-up, which also included a careful record of the reactions of the subjects to the various features of the program, of their answers to the researcher's questions, of the problems they experienced in working with the program and in learning the rules, also supported by an audio record of the sessions with each learner.

In each module, the learners did a number of exercises to practise the rule under investigation. They rotated modes for each of the three modules, in the order, implicit, explicit and exploratory. Each of the modes was formalised, as a different teaching sequence: examples, exercises and revision for the implicit mode; explanations, examples, exercises for the explicit mode; and a choice of access to either of the four components, for the exploratory mode, which would also enable the collection of data on how the exploratory mode would be used.

Once the final version was completed, each module was tested on a sample of 30 secondary school children aged 11-14 in three schools. Chapter 5 gave an account of the local conditions, the composition of the sample groups of learners used, the recording methods used to collect data and examples of learner performance. It also highlights some of the problems and constraints experienced during the testing of the program, due to uncontrollable external factors.

Chapter 5 also detailed two case studies, with learners of different abilities, a successful learner and an unsuccessful one in order to calibrate the full range of learner responses to the program. These two case studies gave us the opportunity to critically evaluate the program designed, and provided a framework to approach the presentation and analysis of the results of the empirical study. We also arrived at some suggestions for improvements of the program and for the teaching of the concept of gender agreement in French.

In Chapter 6, the data collected was then analyzed both in qualitative and quantitative terms, using the records constructed. The quantitative analysis was based on the improvement measure, the formula obtained for measuring the progress made by each of the learners in each of the modes and modules, the percentage of successful learners in

each of the modes and modules; the time taken to complete a practice and the number of questions answered during that practice.

The qualitative analysis used records of the answers given by the learners and of the paths followed through the program, (especially important for the exploratory mode), the scripts from the interviews, (containing the comments made and questions raised about the program), the problems encountered by the learners, the answers given when challenged or asked for justification, and any other observations made by the researcher during the session.

After consideration and analysis of both the quantitative and qualitative data, we came to the conclusion that although all modes achieved some degree of success, the exploratory mode appeared slightly superior to the other two, as the mode achieving a higher improvement score, faster and more efficiently, allowing better performance on the knowledge of the correct rules, and considered generally more flexible and enjoyable. However, it created difficulties in navigation and decision making, and was more suitable for more successful learners having more developed learning strategies. It outperformed the others in one topic, elision.

The implicit mode created more confusion, especially with the less able learners. It was less efficient in terms of time, work covered and led to the formulation of a greater number of incorrect hypotheses; it had worked reasonably well, except for the most difficult topic, agreement .

The explicit mode was the most successful for most learners in two of the topics, contraction and agreement, but slightly less efficient in terms of global improvement score, time and learning outcome. It had proved less challenging than the other two, and more reassuring and familiar for the less successful learners.

We also found that the incorrect hypotheses formulated by the unsuccessful learners, based on orthographical, morphological or semantic criteria were very similar to those already identified in the initial and preliminary analyses.

In the next section we draw the implications of our research findings for linguistic theory, language teaching, CALL program design and research methodology.

## **7.2. Implications for theory and further research.**

### **7.2.1. Implications for gender acquisition and SLA research and theory:**

In the course of the initial error analysis, the preliminary analysis and in the learners' interviews during the trial and testing of the program, we accumulated evidence in favour of the fact that most learners construct and apply their own rules, but do not always formulate the right hypotheses, as some rely on triggering features irrelevant for that rule. Three types of misconceptions, semantic, orthographic and morphological, were identified in Chapters 3, 5, and 6, with the morphological criteria generally taking precedence over the semantic rules. We shall now consider possible explanations which could be offered by linguistic theory.

We recall from Chapter 3 that the basic difference between French and English lies in the emphasis placed and the priority given to a certain category of features, i.e. those which are more relevant and salient, according to the language being acquired. French relies essentially on morphology to assign gender (Corbett,1991; MacWhinney,1987; Carroll,1989) whereas English puts more emphasis on word order.

We noticed in 5.2.1 and 6.3.3. that even some very successful learners had problems in identifying the dependency relationships occurring in the sentence between the head noun and its adjective in sentences of the type:

*Le/La/L'/Les (PART) du/de la/de l' (ANIMAL) est/sont (ADJECTIVE).*

In predicative sentences, the word order in the noun phrase differs in the two languages:

*Le/ La/ L'/ Les (Head: PART) du/ de la/ de l' (ANIMAL) in French vs*

*The (ANIMAL)'S (Head: PART) in English.*

This led to a considerable number of errors, in which the adjective was agreed with the nearest noun :

*a) Le raton-laveur a des yeux \*noir\* (noirs);*

*b) Les yeux de la grenouille sont \*grosse\* (gros).*

This also highlights that our learners needed to discover the new emphasis assigned by French to morphology and to restructure their linguistic system to account for these differences.

The focus of some learners on semantic criteria may also be explainable. In most languages of the world which have grammatical gender, there are always semantic criteria involved in gender assignment (Corbett,1991). The very few gender rules operating in the English language, are also triggered by semantic criteria (it/he/she; it/him/her) and involve opposition of the 3 features (inanimate/[masculine/feminine]). Moreover, French sometimes assigns gender according to semantic rules, even though their scope is rather limited, as discussed in Chapter 3. English speakers learning French would, in the initial stages, use semantic criteria to determine gender, which could account for some of the misconceptions encountered.

Therefore, these could be examples of interference of the first language, with word order, priority of semantic clues, semantic ambiguity -as in the case of 'hair', singular in English

and plural in French, and failure to identify the head noun in a noun phrase, showing a lack of deep knowledge of the dependency relationships in French. These could serve as evidence that second language learners start from their L1 as a base and apply the principles of their L1 to at least the initial stages of the L2 acquisition process.

Moreover, as orthography also plays a vital role in the choice of the determiner, as nouns are matched with different determiners according to whether they start with a vowel, vocalic 'h' or a consonant, this led at times to some confusion in some of the learners, interpretable as an interlingual overgeneralisation. One of our learners kept looking at that feature as a basis of his gender assignment rule, as demonstrated in 5.2.2.

This data appears to be consistent with the UG framework in which the parameters set for the L1 have to be reset for the L2. The problems in L2 acquisition would stem from the fact that L2 like the L1 is structure dependent and some other parameters (i.e. word order and adjacency principle, explained in 1.1.2 ) might have to be reset before the gender agreement rules can be applied and acquired.

According to Carroll's UG account (Carroll,1989), SLA and FLA acquisition processes with respect to gender would be different. gender is a universal feature which could remain available and ready to use in L2 acquisition, or alternatively disappear through lack of use. As English does not have morphological gender, it can be assumed that there is no trigger for the gender feature of the noun in English. Whereas first language learners learn the gender of words as an integral part of the noun feature specification, English native speakers would learn the determiners as distinct syntactic words. Therefore they would have to use different processes to store the gender of words, and carry out a distinct computation to read the gender feature of the various agreeing modifiers (Carroll,1989:578). Moreover, as gender attribution is a necessary condition for gender

agreement, they would have problems with this also, not having "instantaneous access to gender information when they produce sentences" (id:578), and would have to develop rules of thumb to acquire gender, and would experience problems when these rules of thumb conflict.

This data is also consistent with the Competition model of MacWhinney, described in Chapters 1 and 3, which would then explain some of our learners' errors in terms of conflicting cue-validity and cue-weightings for word order and morphology in French. Second language learners would predictably experience problems when, starting from a language in which word order is paramount, morphology plays a very minor role, and grammatical gender hardly exists, they attempt to learn another language which puts a significant emphasis on morphology, and has a strong grammatical gender system exemplifying many morphological variations.

Though we preferred the UG model proposed by Carroll to the competition model as it appeared to have greater explanatory power and accounts best for the data and the misconceptions encountered in our experiments, these two models are neither irreconcilable or incompatible and could be likened to pieces of a jigsaw puzzle (Bell,1981:131), with the UG model dealing with the core grammar, the competition model applying to speech processing and academic classrooms dealing with attitudes to behaviour. It may be the case that an overall model of L2 learning will emerge, if we manage to fit and integrate these models.

This study has not only allowed an evaluation of current trends in linguistic theory, but has also outlined the importance of an awareness of the grammatical structure inherent to a particular language, the problem of interference of the first language and how the preferences and processing principles of the first language are applied at least in the initial

stages of L2 development. Besides, as conscious knowledge of the rules is part of the declarative knowledge of the learner, it has also highlighted the need for procedural knowledge, i.e. the ability to apply these rules within a certain syntactic context, which could be achieved through practice of these rules.

### **7.2.2. Implications for the teaching of foreign languages:**

In chapter 2, we investigated the methods and strategies used in second language teaching, with particular reference to their emphasis or lack of emphasis on the conscious teaching of grammar rules and grammatical concepts. We concluded that consciousness raising was consistent with the latest principles and trends in current language teaching. As the National Curriculum advocated adopting an exploratory approach to the teaching of grammar and giving the learners greater autonomy, we wanted to compare the exploratory approach with the other two approaches, implicit and explicit teaching. The questions we set out to answer were:

- whether it was necessary to teach grammar rules or whether second languages could also be learnt inductively;
- whether analysis and explicit teaching of these grammar rules could facilitate or speed up the learning process.

As Cook (1991) pointed out, there is no perfect way to teach a language. Teachers usually use a combination of styles to suit their own personalities and the needs of their learners. These needs are generally quite complex and need to be clearly identified. Most approaches advocating explicit teaching of grammar were based on a behaviourist model of language learning, in which skilled training techniques and practice was aimed at directing the learner to produce correct responses. 'Communicative' language teaching is historically linked to the 'Interlanguage' theory and hypothesis testing of early UG, with



learners using the natural learning process built into their minds, guessing the rules of language, testing them by producing sentences and either accepting or rejecting these rules according to the feedback provided. This inductive learning of the rules attempts to emulate the conditions of first language acquisition and teachers usually let the learning take care of itself. However, Cook (1991) argued that this type of hypothesis testing requires types of correction never given to L1 learners and seldom encountered in the communicative classroom.

To be able to compare these approaches and strategies, we decided to model them on the computer and try them out on a group of real learners. For the domain of the program, we used the French gender system, a complex area in which even immersion programmes, the closest learning environment to that of first language acquisition and to the communicative approach, had failed. This had raised doubts about the efficacy of implicit teaching, which, because it excluded conscious learning of the gender rules involved, may not be the best teaching strategy to use in a more formal learning environment.

The linguistic problem to be explored was motivated by the detailed error analysis of learners' exam scripts, followed by a preliminary analysis of the rules and hypotheses the learners were making about the French gender system. These had identified a need to raise a greater awareness of the dependency relationships occurring between nouns and their dependents in the sentence, a further vindication of a consciousness raising approach.

There were problems in devising the teaching sequence irrespective of the medium used for teaching gender assignment and agreement, as these were not only predicted to be difficult concepts, but there were also doubts about whether gender assignment obeyed definite rules in French, as seen in Chapter 3. As the syntactic context appeared to play a

vital role for native speakers of French in both gender assignment and agreement, it was also vital to raise the awareness of such a context in non-native speakers.

The process of designing a computer program and of testing the learning outcomes on the learners, highlighted some of the problems and misconceptions entertained by the learners, i.e. focusing initially on the beginning of words, making the adjective agree with the nearest noun, semantic misconceptions possibly prompted by the experimenter when asking the learners to concentrate on the the part rather than the animal, when they were experiencing problems in identifying the head noun.

The program did not succeed in eliminating these misconceptions in any of the modes. This suggests that different strategies would have to be adopted to challenge them. First a deeper analysis of pupils' answers and a comparison of their errors with their correct answers would be needed, to establish what they can and cannot do. These misconceptions were not always transparent, unless the learner was asked to justify his/her answers. It was also suggested that restructuring the linguistic content of the questions might allow us to test our predictions about likely misconceptions.

For example, in the agreement module, an error or a series of errors appearing to suggest that the learner has problems identifying the head noun could lead to a supplementary set of questions containing contradicting evidence in the implicit mode, or a piece of advice about re-consulting the rule, or an error message in the other modes. Once common errors have been identified, we could test and challenge them within the program.

The profiling of the teaching strategies used for the testing of the program also indicated that the implicit mode should be used with caution, as it tended to lead to confusion, incorrect hypotheses formation and usually required the learners to do more work. The explicit mode was found to be the most successful and the safer and the exploratory and

implicit mode were more favoured by the learners, for their challenging, game-like character. However, it would be useful to train the learners in using all the exploratory facilities and making sure they were equipped with the appropriate learning strategies

It became clear that the more difficult the rules and the less able the learners, the more important it is to provide a structured framework in which to practice the rules and to make these rules as explicit and as transparent as possible, to avoid unnecessary misconceptions. Perhaps the best solution for teachers would be to try and use induction for easy and well-defined rules, and train the learners to develop their own discovery and learning strategies for easy problems. More difficult rules might need building up and structuring and the preconditions for applications of these rules might have to be more transparent.

Less structure was implanted into the design of the agreement module. This is also the module in which the learners in all modes did the worst. It was predicted that the learners would need to differentiate between masculine and feminine forms, and be able to use these in the plural. The sentences used deliberately gave few clues as to the gender of the head noun, on which to base the gender of the adjective. Unless the learners had some alternative way to look up the gender of the word or remembered it, from a previous encounter, they would have no other alternative than to guess.

Therefore we can finally conclude that, though explicit statement and practice of the rules is not a panacea, it certainly seems to be more effective in terms of time taken to understand and assimilate a particular rule of grammar and still has its place in foreign language teaching. The computer appeared to have a great potential in helping the learners gain greater awareness of the complex grammatical relationships existing within a sentence, and though the computer program we designed was not entirely successful in

raising this awareness, it led the learners to greater improvements when they were given access to the rules to be learnt.

Overall, we still feel that more research is needed into the best acquisition sequences for each individual rule for each language, to assist with the design of more efficient teaching programs. This is still a colossal task, which will keep researchers occupied for many years to come. Research efforts should concentrate on practical ways to incorporate the findings of SLA research into the classroom environment, raising consciousness of the linguistic structure of the target language and developing greater learner autonomy with the help of the emerging multimedia, whose educational and research potential is still largely unexplored.

### **7.2.3. Implications for CALL program design**

Following the testing of the program with around 30 secondary school children, we found that most of the learners had greatly enjoyed working with the computer, had found it a very positive experience, as they preferred it to sitting down and writing and often considered it a clever way to learn and be taught. Their motivation and enjoyment was generally increased by working with the program, though a few still found it boring and gave up.

The learners appreciated the instant feedback given in the exercises for each of the questions, a luxury not available in a crowded classroom. Most also enjoyed the animal pictures which were included on all the exercise cards of the program, and found the implicit mode more challenging as it emulated the computer games they may often spend hours on. Many enjoyed working things out for themselves, i.e. puzzle or problem solving. The 'exploratory' mode was generally more popular, as it could provide instant access to a variety of facilities and help features on line, unavailable in a normal

classroom situation. The main problem was that the learners were not familiar with such an environment and often needed guidance on how to use this mode to the best of its potential. It was felt beneficial to provide differentiated advice as to which path to navigate, according to the learners' patterns of errors and misconceptions detected, as mentioned in 7.2.2..

Some of the learners also experienced problems with the help features and highlighting, which suggested that the use of highlighting and other attention seeking features should be used with great circumspection. Their use and function needed to be explicitly demonstrated to the learners at the beginning of the sessions.

The following features in designing CALL programs could prove useful in facilitating the learning and acquisition of learning strategies:

- 1) Animated demonstration- i.e. include an animated demonstration for each mode, providing one or two examples, just to get the learners familiar with the program facilities and the available help features before starting on the exercises, and perhaps providing training on how to use the features of the program to their best advantage;
- 2) scoring - i.e. include some incentives and an optional scoring facility in the exercises to train the learners to monitor their own progress and to increase motivation;
- 3) minimal highlighting -i.e. use highlighting sparingly and make its function more transparent, so as not to mislead the learners.

Further, as the exploratory mode was found to be more attractive and motivating for the more able learners, but more puzzling for the less able, who found it difficult to make decisions about the paths to follow, it might be useful to experiment further with this

mode, in other linguistic domains, to train the learners into using this aspect of the programs to the full. Careful monitoring of learner behaviour and performance could also provide better insights into learner processes and strategies.

This was not only recommended as a preferred teaching strategy by the National Curriculum, but also appears to be the strategy which would allow the learners to make the best possible use of the emerging multimedia language teaching programs, which may all include sound, graphics and possibly video and allow the learners to record their own voices, and monitor their own production and progress, thereby promoting greater autonomy.

Varying the types of exercises and tasks provided might also be of greater benefit to the learners, as it could improve their motivation and sense of fun when using the program. As noted in chapter 6, some of the learners had found the program boring. This is not surprising as these exercises were designed more with the aim of testing our research question about the most effective teaching strategy in a computer based learning environment than as the best framework to adopt for the teaching of the French gender system. The design of the program and the subsequent testing therefore allowed us to establish more facts about the preferred and most effective teaching strategy for implementing grammar CALL programs, and to identify the most common misconceptions encountered in the learners.

Therefore, a different design might be called for a teaching program, more on the lines of that outlined in Laurillard and Manning (1993). This paper suggested an alternative design for a program capable of diagnosing and remedying the underlying misconceptions of the learners, by allowing them to demonstrate their conception, through selection from

available information concerning either the spelling, gender or meaning of the noun, and rewarding the selection of appropriate and accurate information as a better performance.

A program of this type would help provide a diagnostic of the learners' misconceptions, provide at least extrinsic feedback to the learner, and improve the learners' processing skills. However, it would also be desirable to address the descriptive level by debriefing the learners on their performance at the end of the game and help them develop strategies to progress to a faster level.

#### **7.2.4. Implication for research methods**

This study also highlighted the importance of using a variety of research methods to motivate the design and implementation of Intelligent Tutoring systems. The error analysis informed us about possible errors and problems to concentrate on in the design of the program. The error analysis, the preliminary analysis and the rich data collected during this research study all indicated that the learners were having considerable problems at times in mastering the French gender system. By looking back at linguistic and learning theory, we were able to suggest possible explanations for this state of affairs, and to identify two suitable models consistent with the findings of our research and with our data.

The misconceptions we encountered are not easy to predict from linguistic theory. We have suggested how these could be tested and challenged in the 7.2.3. The process of restructuring their own interlanguage system, which involves trying one particular rule or hypothesis for a very limited period, makes the task of the researcher very arduous at times. In Manning (1994), we demonstrate that it is not always possible to identify the source of the learners' errors, without asking them how they arrived at their answers. Even then, the learners could not always be aware of the principles or reasons by which they

gave any answers. The source of the error can only be hypothesized from combining linguistic theory with qualitative and quantitative performance data.

This research could be used as the foundation for the design of an Intelligent Tutoring system, as it contains a wealth of information about how learners think about and approach these topics. Through the analysis of the data collected, through the computer and manual and audio-records, we showed how it would be possible to construct learner profiles, which could form the foundation for the rules of a possible Intelligent Tutoring system to teach these gender rules.

We have also shown how it is possible to test and model different approaches and styles on the computer and this provides us with a valuable scientific framework in which to carry out evaluations in second language teaching methodology. As mentioned by Cook (1991), as most teachers use a combination of teaching styles, classroom observation makes it difficult to discover the philosophy underlying the techniques used and observed. The efficacy of these techniques might also be dependent on the ability of the teacher delivering them and the quality of the materials and resources used.

By using a computer, and designing a CALL program, we could therefore not only clarify our basic assumptions and make them explicit but also standardize the delivery of the teaching across the board, in different schools, with learners of differing abilities. Therefore the testing procedures employed could be more rigorous. The research and evaluation methods were original and well-justified and could provide a blue print for the design of future CALL syntax programs.

Careful computer recording and monitoring of learner behaviour and performance could constitute a valuable complementary tool to research into learner strategies, acquisition sequences, Interlanguage development and language teaching methodology. We therefore



suggest that trial and testing of various exploratory environments would be an avenue well worth exploring in detail in the near future.

### **7.3. Conclusion.**

In this thesis, which looks at the design of CALL programs from a second language acquisition perspective, as advocated by Cook (1991) and Matthews (1992), we have investigated and probed the relationships between linguistic and learning theories and language teaching, especially whether a second language could be acquired in the same way as a first, i.e, inductively. We also investigated the problem of the acquisition of the French gender system for native speakers of English, in relation to these theories, and attempted to design a computer program to raise the awareness of our target learners to the syntactic and morphological criteria involved in the competence of this French gender system. We found evidence of the learners constructing their own system of rules, some of which were influenced by the rules of their first language. Two linguistic models offered us a set of reasonable explanations about the possible origin of some of the errors and wrong rules formulated by the learners.

Computers provided us with a richer and more flexible learning environment, in which to design a program to test more rigorously than with classroom observation or controlled teaching, the relative merits of three competing teaching strategies, implicit teaching, which attempts to mirror the conditions of first language acquisition, explicit teaching, which has been used traditionally in formal language instruction settings, and exploratory teaching, the approach recommended by the National Curriculum document for Modern Foreign languages.

This study showed that implicit teaching only may lead learners to more errors and misconceptions, would necessitate more exercises and examples for them to arrive at the

right rules and that some may never get there and carry on making the same errors if uncorrected. The explicit mode was more efficient in terms of learning outcome and made the learners generally feel more secure. However, the exploratory mode of learning appeared to lead to greater learning gains for those who could find a way through the maze of instructions and help facilities available.

The testing of this program with second language learners showed that working with computers could increase their motivation, and that the program devised was generally successful in raising our learners' awareness of the linguistic relationships obtaining within the French grammatical gender system.

We therefore suggested that more research and trials of implementation of different versions of an exploratory approach might lead to a better learning environment both in a classroom and computer-aided environment. As mentioned by Willems (1993), each learner may need to develop individual approaches to learning, by learning how to learn autonomously." Effective learning requires that learners understand the process of foreign language learning and can plan their learning strategically in the light of this understanding" (O' Malley & Chamot, 1990). Experimentation with the exploratory learning environment might therefore help learners, theoreticians, and researchers to blaze more trails towards a better understanding of the language learning process, on which we hope to have opened some windows and new perspectives. In this, computers and the rapid advancement of technology can play an important role, as researchers and theoreticians need to refine their models of language acquisition so that they can be tested by better programs. As many more become more familiar with computer environments, this allows a common framework for researching language acquisition, cognitive processes and more general human behaviour.

We have not been able to settle so far the debate between the mentalists and associationists (behaviourists), as the data we encountered would have been consistent with both the theories we chose to investigate in greater depth, the UG and the Competition model. The burden of proof still lies on further research.

We hope in this thesis to have given an inkling of the potential of the computer for language learning, for better motivating language learners, for raising their awareness of the different linguistic connections encountered in different languages, and for helping them memorise. We believe the use of computers in that area could lead to greater learner autonomy and improved learning outcomes.

We also hope to have shown the benefits of testing thoroughly current CALL programs and different learning environments and help features. This evaluation process has allowed not only greater communication with the learners, but also more insight into their potential problems and difficulties, and more detachment from the teaching process.

The computer provides the mechanical teaching and therefore frees the teacher or researcher to probe more deeply the knowledge of the learners, and has facilitated the collection and analysis of invaluable data for future second language acquisition research. We also have demonstrated how it might be possible to use this data collection process to test the validity of the current and future models of second language acquisition and to research into learning strategies specific to language learning.

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## **APPENDICES**

### **APPENDIX A: INITIAL STUDY: LEARNER ERRORS IN GCSE EXAM SCRIPTS:**

#### **A1. GENDER ERRORS:**

masculine instead of feminine:

- \*\* le moto, la moto,
- \*\* mon famille, ma famille,
- \*\* près mon maison, ma maison,

feminine instead of masculine:

- \*\* la soleil, le soleil,
- \*\* la stade, le stade,
- \*\* une salon, un salon,

#### **A2. VOWEL RULES ERRORS:**

rule not applied:

- \*\* le adresse ..... l' adresse.

rule misapplied:

- \*\* la l' autobus, l' autobus,
- \*\* ma l'école, mon école,
- \*\* m' école, mon école,
- \*\* à l' piscine, à la piscine,

#### **A3. AGREEMENT ERRORS:**

agreement not applied:

- \*\* une grand maison, une grande maison,

overextension of agreement rule:

- \*\* ma grande mère, grand-mère.

#### **A4. AMBIGUOUS ERRORS:**

- \*\* le fenêtre grande, la grande fenêtre,
- \*\* le dernière lettre, la dernière lettre.

#### **A5. CONTRACTION RULE:**

- \*\* à le restaurant, au restaurant,
- \*\*pres du campagne, près de la campagne,

#### **A6. COMPOUND ERRORS:**

- \*\* près mon maison, ma maison,
- \*\* au apre midi, l' après-midi.

**APPENDIX B: PRELIMINARY STUDY:****B1. TESTS CARRIED OUT:****B1a ) Learning tasks (a & f):**

le manteau - the coat  
 le parapluie - the umbrella  
 le collant - the tights  
 le pantalon - the trousers  
 le chapeau - the hat  
 la robe - the dress  
 la chemise - the shirt  
 la jupe - the skirt  
 la blouse - the overall  
 la veste - the jacket  
 l' anorak - the anorak  
 l' imperméable - the raincoat

**B1b ) Pattern recognition tasks (b):**

a) similarities between words:  
 b) differences between words of the lists.

List A:

le ballon  
 le bateau  
 le camion  
 le train  
 le vélo

List B:

la mobylette  
 la moto  
 la voiture

List C:

l' aéroglisseur  
 l' autobus  
 l' avion

**B1c ) Gender guessing without context (c):**

LE, LA OR L' ?

**COMPLETE LIST D:**

armoire  
 bureau  
 chaise  
 fenêtre  
 canapé  
 coussin  
 étagère

fauteuil  
lampe  
lit  
ordinateur  
oreiller  
porte  
table  
tabouret  
télévision

**B1d ) Gender guessing in context (d):**

tell or guess whether the following phrases come with  
le, la or l'.

PETIT LIT  
PETITE TABLE

GRANDE ARMOIRE  
GRAND VELO

GROSSE VOITURE  
GROS BATEAU

**B1e ) Grammaticality judgments (e):**

Spot the mistakes:

LA MOTO  
LA PETIT MOTO  
LA PETITE BATEAU  
LA VELO  
LE GRAND VOITURE  
LE GRANDE TELE  
LE PETIT LIT  
LE AEROGLISSSEUR

**B 2) PRELIMINARY STUDY RESULTS:**

**B2a ) Vocabulary learning strategies:**

- Looking at the words
- looking up & down
- looking across
- mouthing the words
- saying the words aloud
- writing the words
- hiding the words
- changing the order of presentation
- revising the words
- checking
- self-testing
- using mnemonics, first letters, mind pictures, sound pictures.

**B2b ) Pattern recognition examples:**i ) example 1 :Similarities spotted in masculine list::

- all words had something to do with travel.
- all words had 'le' at the beginning, after being prompted.

Similarities spotted in feminine list:

- 'la' at the beginning.
- and 'o' for the second letter,
- and all had a 't' in.

Similarities spotted in vowel list:

- all had pictures under the words,
- all depicted things with people in them, i.e. were 'vehicles'
- 'l' at the beginning of each word,
- had 'a' at the beginning of each word
- had a speech thing, i.e. an apostrophe.

Differences spotted between lists 1 & 3:

- Items in list 1 go on land, whereas items in list 3 on air or water.
- List 1 had all 'le' in front of them and words in list 3 'l'.

Differences between lists 1 & 2:

- Items of list 2 were all 'la' words.

ii) example 2:Masculine list similarities:

- the wheels,
- goes on air and goes on water

After a prompt to look at the spelling, answered:

- They all have "le"
- and could not spot anything else.

Feminine list similarities:

- they all have wheels again,
  - the pictures had a similar background, i.e., grass and fields,
- after being asked to look at the spelling, said:
- they all begin with 'la',
  - The people ride on them.

Vowel list similarities:

- they all begin with 'l',
- the back bits were similar for the plane and the hovercraft,
- the sky was visible in all the pictures,
- you could see the sky.

Differences between lists A & B:

- In some of the means of transportation, you could get wet and not in others,
- the air balloon was pumped in with air, only with air,
- boat paddles with kind of sticks

When asked to look at the words and their spellings, he added:

- they begin with different letters,
- they are all different words,



- and when focused to the beginning of the words, he also replied that- they had 'le' or 'la' at the beginning, I said that already.

Differences between A&C :

- all begin with ' le' & 'l' ',
- some have wheels , some don't,
- shooting air comes out of some, I said that already,
- some fly, others go on water or land.

iii) example 3:

Masculine list similarities:

- all masculine words,
  - all had got 'le' in front of them, ( His teacher had mentioned it 3 weeks into the term ),
- and when asked if they had anything else in common, he mentioned that:
- they were all transport.
- He could not find anything else to add.

Feminine list similarities:

- all feminine words,
  - they had 'la' instead of 'le',
- When prompted about whether the words had anything else in common, he said that:
- they all had engines,
  - they all had wheels,
  - and were all transport.

Vowel list similarities:

- they all had 'l' ' in common, ( but did not know why yet).
  - The words were all the same,
  - they were for getting people about, on land, sea and air.
- After a prompt to look at their spelling, he said :
- they all began with an " a", and then could not think of anything else.

Differences between Lists:

When asked about the differences he could see between the two, he listed:

- the beginning words,
- the different kinds of power,
- the fact that men drove the items in the first list ,
- some were carrying goods, others people,
- and they were all powered by different things.

**B2c ) Misconceptions identified:**

1 ) Semantic misconceptions:

\* are masculine:

- big, strong, powerful or mobile things.
- objects used by men.

\* are feminine:

- soft, small, static things.
- objects used by women.

\* take "l' " :

- when you can't tell.

2) Orthographic misconceptions :\* are masculine words that :

- have "le" or "el".
- end in "e".
- have "e" as their second letter.
- have a lot of vowels.
- have no vowels at the end.

\* are feminine words which

- have no "l"s.
- have no "e"s
- have "a" as a second letter.
- have "a"s in them.
- end in "e".

\* take "l" words which:

- end with "l".
- are neither masculine nor feminine.

3) Phonetic misconceptions:

- strong sounding words are masculine.
- soft sounding words are feminine.

**B3) EXAMPLES OF SESSION RECORDS:**Example 1:Context free gender guessing:

ITEM:	GIVEN	EXPECTED	REASON
ordinateur	l'	l'	piece of machinery
oreiller	l'	l'	both nouns and verbs
porte	l'	la	it's a thing
table	l'	la	"
chaise	l'	la	"
bureau	le	le	don't know
canapé	l'	le	it's a thing
coussin	la	le	don't know
armoire	le	l'	"
tabouret	la	le	just guessed
étagère	l'	l'	it's a thing
télévision	le	la	don't know
fauteuil	la	le	"
lampe	l'	la	"
lit	l'	le	thing
fenêtre	la	la	don't know

The learner seemed to have made up one rule, i.e. that "things", tables, chairs etc came with 'l'. However, though he kept to it 10/ 16 times, he did not apply it consistently.

Gender guessing in context:

ITEM	GIVEN	EXPECTED	REASON
petit lit	le	le	both little
petite table	le	la	"
grand vélo	le	le	don't know
grande armoire	la	la	"e" at the end of petite
gros bateau	la	le	just guessed
grosse voiture	le	la	just guessed

Example 2:Context-free gender guessing task:

ITEM	GIVEN	EXPECTED	REASON
oreiller	l'	l'	guessed
porte	le	la	says 'the'
étagère	le	l'	"
télévision	la	la	guessed kind of, it's 'la', not 'le'.
fauteuil	le	le	guessed.
lit	la	le	sounds right, 'la' bed.
lampe	le	la	sounds right
armoire	l'	l'	sounds right for a cupboard
coussin	le	le	sounds right, 'le' cushion.
canapé	le	le	sounds right, 'le' sofa.

Context-sensitive gender guessing task:

ITEM	GIVEN	EXPECTED	REASON
petite table	la	la	it goes with it
petit lit	le	le	it goes
gros bateau	le	le	goes with it
grosse voiture	l'	la	goes with it
grande armoire	le	la	goes with it
grand vélo	la	le	" "

Example 3:Gender guessing without context:

ITEM:	GIVEN	EXPECTED	REASON
oreiller	le	l'	got 'le' in it
ordinateur	la	l'	does not have an 'l' ', you can guess.
fenêtre	le	la	same way as the other
fauteuil	l'	le	ends with 'l' , plain 'l' at end.
télévision	le	la	sort of sounds the same, has 'el'
étagère	le	l'	mostly 'es' in it, sounds the same

Context-sensitive gender guessing:

ITEM	GIVEN	EXPECTED	REASON
grosse voiture	le	la	because of the "es" Different from the other, different letters.
gros bateau	la	le	
petit lit	l'	le	pronounced like 'lit' both got 'le'
petite table	le	la	
grand vélo	le	le	got 'le' in it the other way round mostly got 'es'
grande armoire	le	la	

**B4) RULE APPLICATION:****B4a ) Vowel rule application:**

- spotted the " a" in word list 67/92%
- applied the rule 16/75%
- stated the rule 0 / 41%
- spotted & corrected 11/50%
- were consistent 0 /25%

**B4b ) Vowel rule examples:**case 27:

- noticed "a" s in the list
- gave the following answers:  
l' canapé, l' étagère, la oreiller
- le aeroglisseur ( correct).

case 10:

- noticed "a"s in the list of "l' " words
- stated " not two vowels together"
- l' armoire, l' étagère, l'oreiller.
- le aeroglisseur ( should be "l' ").

case 6:

- mentions the "a"s for the "l' " list.
- L'armoire, l' tabouret, l' télévision.
- does not spot the error.

**B4c ) Agreement rules induction:**

- noticed "e"s at the end of adjs 16/83%
- applied the rule 6 /45%
- found/ remembered the rule 11/58%
- spotted and corrected errors 6 /25%
- were consistent 0 /33%

**B4d ) Agreement examples:**

case 11(11):

gives the following answers:

- le grand vélo & la grande armoire ( way it sounds to me).
- le gros bateau & la grosse voiture ( difference in spelling, 'table has an "e" at the end)

does not spot any errors.

case 13 (11):

- le gros bateau/la grosse voiture ( se is the feminine form).
- la grande armoire/le grand vélo ( same reason).
- le petit lit/ la petite table ( easier to tell).

spots the following errors:

- la petit moto ( la & petit),
- la petite bateau( wrong, masculine, should be ' le petit bateau',
- le grand voiture ( wrong, ca remember from list, "la grande").
- le grande télé ( don't know gender, I think it's a "le", should not have an "e").
- le petit lit ( correct).

case 19 (13):

gives the following answers:

- la grande armoire/le grand vélo ( makes sense).
- la petite table/le petit lit ("e" at the end of "petite").
- le gros bateau/la grosse voiture ( goes with it).

gives the following grammaticality judgments:

- la moto ( right)
- la petit moto ("le" makes more sense), challenge, (petit should have an 'e' at the end).
- le grande télé ( wrong, has an "e" at the end)
- la petite bateau ( right)
- le petit lit (right)
- le grand voiture ( right).

case 23 (13):

gives the following answers:

- le petite table/ le petit lit ( guess)
- le grosse voiture/la gros bateau ( guess)
- le grand vélo, la grande armoire ( guess, differences in "e"s).

spots the following errors:

- la petit moto ( should be "le").
- la petite bateau ( right).
- le grand voiture ( right).
- le grande télé ( should be "la").
- le petit lit ( right).

**APPENDIX C: LINGUISTIC CONTENT OF THE GENDER PROGRAM:****C1: CONTENT OF ELISION MODULE:****C1a ) Rest of pre and post test questions:**

- 2) *Voici un chameau: ..... chameau a de longs poils.*
- 3) *Voici un cochon: ..... cochon a de petites pattes.*
- 4) *Voici un écureuil: ..... écureuil a une longue queue.*
- 5) *Voici une girafe: ..... girafe a un long cou.*
- 6) *Voici une grenouille: ..... grenouille a de gros yeux.*
- 7) *Voici une hirondelle: ..... hirondelle a un petit bec.*
- 8) *Voici un lion: ..... lion a une grosse tête.*
- 9) *Voici un ours: ..... ours a de grosses pattes.*
- 10) *Voici un singe: ..... singe a de petits yeux.*

**C1b ) Practices**Masculine/ Feminine Practices:**MC 1:**

- 2) *Voici une girafe: La girafe est grande.*
- 3) *Voici un morse: Le morse est gros.*
- 4) *Voici un chat: Le chat est petit.*
- 5) *Voici une vipère: La vipère est longue.*
- 6) *Voici une chouette: La chouette est grosse.*
- 7) *Voici un chameau: Le chameau est grand.*
- 8) *Voici une panthère: la panthère est longue.*
- 9) *Voici un singe: Le singe est malin.*
- 10) *Voici un rhinocéros: Le rhinocéros est gros.*

**FI 1:**

- Voici un chameau : Le chameau est grand.*  
*Voici un poisson : Le poisson est gros.*  
*Voici une grenouille: La grenouille a une grosse tête.*  
*Voici un singe: Le singe est malin.*  
*Voici une girafe: La girafe est grande.*  
*Voici un rhinocéros: Le rhinocéros est gros.*  
*Voici un lion: Le lion est gros.*  
*Voici une panthère : La panthère est longue.*  
*Voici un morse: Le morse est gros.*

Masculine Words only:**MC 2**

- 1) *Voici un poisson: Le poisson est gros.*
- 2) *Voici un ours: L' ours est gros.*
- 3) *Voici un morse : Le morse est gros.*
- 4) *Voici un chat: Le chat est petit.*
- 5) *Voici un oiseau: L' oiseau est petit.*
- 6) *Voici un rhinocéros: Le rhinocéros est gros.*
- 7) *Voici un hippopotame: L' hippopotame est gros.*
- 8) *Voici un écureuil: L' écureuil est petit.*
- 9) *Voici un singe: Le singe est malin.*
- 10) *Voici un chameau: Le chameau est grand.*

**FI 2**

- 1) *Voici un poisson: Le poisson est gros*
- 2) *Voici un éléphant.: L' éléphant est petit.*
- 3) *Voici un rhinocéros: Le rhinocéros est gros.*
- 4) *Voici un hippopotame : L' hippopotame est gros*
- 5) *Voici un lion: Le lion est gros.*
- 6) *Voici un oiseau : L' oiseau est petit.*
- 7) *Voici un singe: Le singe est malin.*
- 8) *Voici un chameau: Le chameau est grand.*
- 9) *Voici un ours: L' ours est gros.*
- 10) *Voici un écureuil: L' écureuil est petit.*

Feminine Words only:**MC 3**

- 1) *V.. une grenouille: la grenouille est grosse*
- 2) *V.. une girafe: la girafe est grande*
- 3) *V.. une hirondelle: l' hirondelle est longue*
- 4) *V.. une vipère: la vipère est longue*
- 5) *V.. une anguille: L' anguille est longue*

**FI 3**

- la grenouille a une grosse tête*  
*l' hirondelle est longue*  
*l' antilope est grande*  
*la panthère est longue*  
*la girafe est grande*

- 6)V.. une antilope: l' antilope est grande  
 7)V.. une panthère: la panthère est longue  
 8)V.. B chouette: La chouette est grosse

- la girafe est grande  
 l' anguille est longue  
 la chouette est grosse

#### Mixed words:

##### MC4

- 1V.. un poisson: le poisson est gros  
 2)V.. un ours: l' ours est gros  
 3)V.. un morse: le morse est gros  
 4)V.. un chat: le chat est petit  
 5)V.. un oiseau: l' oiseau est petit  
 6)V.. un rhinocéros: le rhinocéros est gros  
 7)V.. un hippopotame: l' hippopotame est gros  
 8)V.. une girafe: la girafe est grande  
 9)V.. une antilope: l' antilope est grande  
 10)V une panthère: la panthère est longue

##### MC 5

- 11)V.. une chouette: la chouette est grosse  
 12)V.. une anguille: l' anguille est longue  
 13)V.. une vipère: la vipère est longue  
 14)V.. un écureuil: l' écureuil est petit  
 15)V.. un singe: le singe est malin  
 16)V.. une hirondelle: l' hirondelle est longue  
 17)V.. une grenouille: la grenouille est grosse  
 18)V.. un chameau: le chameau est grand  
 19)V.. un éléphant: l' éléphant est petit  
 20)V.. un lion: le lion est gros

##### FI 4

- la grenouille a une grosse tête.  
 le poisson est gros  
 l' éléphant est gros  
 le rhinocéros est gros  
 la vipère est longue  
 la chouette est grosse  
 le lion est gros  
 l' hippopotame est gros  
 le morse est gros  
 le chat est petit

##### FI 5

- le singe est malin  
 l' anguille est longue  
 la girafe est grande  
 l' écureuil est petit  
 l' ours est gros  
 la panthère est longue  
 l' antilope est grande  
 le chameau est grand  
 l' hirondelle est longue  
 l' oiseau est petit

## C2. CONTENT OF CONTRACTION MODULE:

### C2a ) Contraction Pre/Post Tests:

#### Pre Test

- 1) Voici le cou de la cigogne.  
 2) Voici la queue du chien.  
 3) Voici la tête de l' aigle.  
 4) Voici le corps de l' hyène.  
 5) Voici l' aile du pingouin.  
 6) Voici les pattes de l' antilope.  
 7) Voici les poils du chameau.  
 8) Voici les yeux du hibou.  
 9) Voici les oreilles de la souris.  
 10) Voici le bec du pélican.

#### Post Test

- Voici les poils du chameau.  
 Voici le corps de l' hyène.  
 Voici les pattes de l' antilope.  
 Voici les yeux du hibou.  
 Voici le bec du pélican.  
 Voici le cou de la cigogne.  
 Voici l' aile du pingouin.  
 Voici la tête de l' aigle  
 Voici les oreilles de la souris.  
 Voici la queue du chien.

### C2b ) Contraction Examples:

- 2) Voici un oiseau: Voici le bec de l' oiseau  
 3) Voici une hyène : Voici le corps de l' hyène.  
 4) Voici un hibou: voici les ailes du hibou.

- Voici un pingouin: Voici le bec du pingouin.  
 Voici une girafe : Voici le corps de la girafe.  
 Voici une hirondelle: Voici les pattes de l' hirondelle.

**C2c ) Contraction Practices Contents:**Masculine/feminine (du /de la) :**MC 1**

- 1) Voici un rhinocéros: voici le cou du rhinocéros.
- 2) Voici une panthère: ..... de la panthère
- 3) Voici un chameau: ..... du chameau.
- 4) Voici un pélican : ..... du pélican.
- 5) Voici une cigogne: ..... de la cigogne.
- 6) voici un chien : voici la queue du chien.
- 7) Voici une vipère : ..... de la vipère.
- 8) Voici une girafe: ..... de la girafe.
- 9) Voici un singe: ..... du singe.
- 10) Voici un chat : ..... du chat.

Masculine only (du /de l' ):**MC 2**

- 1) Voici un pingouin: voici le bec pingouin.
- 2) ..... un aigle: ..... le bec 'aigle.
- 3) ..... un héron: ..... le bec héron.
- 4) ..... un cygne: .... le bec cygne.
- 5) ..... un oiseau: .... le bec oiseau.
- 6) ..... un aigle : .... l'aile 'aigle.
- 7) ..... un hibou : ... l'aile hibou.
- 8) .... un épervier: .... l'aile épervier.
- 9) .... un héron: ..... l'aile héron
- 10) Voici un pélican : voici l'aile pélican.

Feminine only (de la /de l' ):**MC 3**

- 1) Voici une anguille: Voici le corps anguille.
- 2) V... une cigogne: V... le corps cogogne.
- 3) V... une hyène: V... le corps 'hyène.
- 4) V... une alouette: V... le corps 'alouette.
- 5) V... une panthère: V... le corps panthère.
- 6) V... une antilope: V... la tête 'antilope.
- 7) V... une hirondelle: V... la tête 'hirondelle.
- 8) V... une chouette: V... la tête chouette.
- 9) V... une grenouille: V... la tête grenouille.
- 10) V... une otarie: V... la tête otarie.

Vowels and H's only [du ( h) / de l' (h)]:**MC 4**

- 1) Voici une antilope: V.. les oreilles de l' antilope.
- 2) V.. un chameau: V.. les oreilles du chameau.
- 3) V.. une girafe: V.. l'oreille de la girafe.
- 4) V.. une hyène: V les oreilles de l' hyène.
- 5) V.. un hibou: V. les oreilles du hibou.

**FI 1**

Voici un chameau : voici le cou du chameau.  
 Voici une vipère: ..... la queue de la vipère.  
 ..... un girafe : ..... le cou de la girafe.  
 ..... un hibou: ..... le cou du hibou.  
 ..... un singe: ..... la queue du singe.  
 ..... un chien: ..... la ..... du chien.  
 ..... pélican: ..... le cou du pélican.  
 ..... un chat: ..... la queue du chat.  
 ..... une panthère: ..... de la panthère.  
 ..... une cigogne: ..... le cou de la cigogne.

**FI 2**

Voici un héron : voici l'aile héron.  
 ..... un aigle : voici l'aile aigle.  
 ..... un pélican: ..... le bec .....  
 ..... un épervier: l'aile '.....  
 ..... un cygne: le cou cygne.  
 .... un oiseau: l'aile oiseau.  
 ..... un hibou: .... l'aile hibou.  
 ..... un héron : ..... le bec héron.  
 ... un aigle : ..... le bec aigle.  
 Voici un épervier: ..... le bec épervier.

**FI 3**

V... une alouette: V... la tête alouette.  
 V... une otarie: V... la tête otarie.  
 V... une antilope: V... la tête 'antilope.  
 V... une hirondelle: V... la tête hirondelle.  
 V.. une grenouille: V... le corps grenouille.  
 V... une anguille: V... la tête anguille.  
 V... une cigogne: V... le corps cigogne.  
 V... une panthère: V... le corps panthère.  
 V... une hyène: V... le corps hyène.  
 V... une chouette: V... la tête chouette.

**FI 4**

V.. un ours: V.. les poils de l' ours.  
 V.. une hirondelle: V.. le bec de l' hirondelle.  
 V.. une vipère: V.. la tête de la vipère.  
 V.. un cygne: V.. l'aile du cygne.  
 V.. un héron: V.. le cou du héron.



- 6)V.. une alouette: V.. les pattes de l' alouette.  
 7)V.. un héron: V.. les pattes du héron.  
 8)V.. un cygne: V.. les pattes du cygne.  
 9)V.. une panthère: V.. les pattes de la panthère.  
 10)V.. un aigle: V.. les pattes de l' aigle.

#### Mixed Items:

##### **MC 5**

- 1)V.. une grenouille: V.. les yeux de la grenouille.  
 2)V.. un hibou: V.. les yeux du hibou.  
 3)V.. un singe: V.. les yeux du singe.  
 4)V.. un renard: V.. les yeux du renard.  
 5)V.. une antilope: V.. les yeux de l' antilope.  
 6)V.. une belette: V.. les poils de la belette.  
 7)V.. un ours: V.. les poils de l' ours.  
 8)V.. une hyène: V.. les poils de l' hyène.  
 9)V.. un chameau: V.. les poils du chameau.  
 10)V.. un lion: V.. les poils du lion.

- V.. un cochon: V.. les oreilles du cochon.  
 V.. une alouette: V.. les pattes de l' alouette.  
 V.. une panthère: V.. la queue de la panthère.  
 V.. un rhinocéros: V.. le corps du rhinocéros.  
 V.. une chouette: V.. les yeux de la chouette.

##### **FI 5**

- V.. un chien: V.. les pattes du chien.  
 V.. un pélican: V.. le bec du pélican.  
 V.. une cigogne: V.. le cou de la cigogne.  
 V.. un écureuil: V.. la queue de l' écureuil.  
 V.. une anguille: V.. la tête de l' anguille.  
 V.. un éléphant: V.. les oreilles de l' éléphant.  
 V.. un aigle: V.. les ailes de l' aigle.  
 V.. un singe: V.. les poils du singe.  
 V.. une grenouille: V.. les yeux de la grenouille.  
 V.. une cigogne: V.. le cou de la cigogne.

### **C3 ) CONTENT OF AGREEMENT MODULE:**

#### **C3a ): Pre/ Post Tests:**

##### **Pre Test**

- 1) La queue de la panthère est noire.  
 2) Le héron a un long cou.  
 3) Le hibou a de grands yeux.  
 4) Les oreilles de l'hippopotame sont petites.  
 5) Les poils du chat sont noirs.  
 6) Le lion a une grosse tête.  
 7) Le pingouin a un bec noir.  
 8) La coccinelle est petite.  
 9) Les pattes de la souris sont noires.  
 10) La libellule a de longues ailes.

##### **Post Test**

- Le lion a une grosse tête.  
 Le héron a un long cou.  
 Les oreilles de l'hippopotame sont petites.  
 La coccinelle est petite.  
 Les pattes de la souris sont noires.  
 Le hibou a de grands yeux.  
 Les poils du chat sont noirs.  
 La libellule a de longues ailes.  
 Le pingouin a un bec noir.  
 La queue de la panthère est noire.

#### **C3c ) Agreement Practices:**

##### Singular masculine/feminine words only [ E / - ]:

##### **MC 1**

- 1) Voici un chien. Le chien est petit.  
 2) ..... une vipère. La vipère est longue.  
 3) ..... une girafe. La girafe est grande.  
 4) .... un chat. Le chat est noir.  
 5) ..... un rhinocéros. Le rhinocéros est gros.  
 6) ..... une panthère: La panthère est noire.  
 7) ..... une hirondelle: L'hirondelle est petite.  
 8) ..... une chouette: La chouette est grosse.  
 9) .... un héron: Le héron est grand.  
 10) ..... un renard: Le renard est long.

##### **FI 1**

- La queue de la vipère est longue.  
 Le cou de la girafe est long.  
 Le bec du pingouin est petit.  
 L' aile de l' aigle est grande.  
 La tête du hibou est grosse.  
 Le corps de la cigogne est noir.  
 Le pélican a un long bec.  
 Le chat a une queue noire.  
 L' anguille a une petite tête.  
 L'hippopotame a un gros cou.

## Masculine words only[ S/- ]:

## MC 2

- 1) Voici un oiseau: Le corps de l'oiseau est noir.
- 2) V.....: Les yeux de la grenouille sont gros.
- 3) .....: Le cou de l'aigle est gros.
- 4) .....: Le bec du pingouin est petit.
- 5) .....: Les poils du chien sont longs.
- 6) .....: les yeux du hibou sont grands.
- 7) .....: le cou du héron est long.
- 8) .....: Les poils du chat sont noirs.
- 9) .....: Le bec du pélican est grand.
- 10) .....: Les yeux de l'hippopotame sont petits.

## Feminine words only [ ES / E ]:

## MC 3

- 1) Voici un éléphant: La trompe de l'éléphant est grande.
- 2) V....: La queue de la panthère est longue.
- 3) V.....: Les pattes de l'alouette sont petites.
- 4) V.....: Les pattes du héron sont longues.
- 5) V....: La corne du rhinocéros est grosse.
- 6) V.....: Les oreilles du hibou sont grandes.
- 7) V.....: La tête du chat est noire.
- 8) V...: Les pattes du cygne sont grosses.
- 9) V.....: La tête de la girafe est petite.
- 10) V.....: Les ailes de l'oiseau sont noires.

## Plural words only[ ES / S ]:

## MC 4

- 1) Voici un écureuil: Les pattes de l'écureuil sont petites.
- 2) V....: Les yeux du hibou sont noirs.
- 3) V...: Les ailes de l'hirondelle sont noires.
- 4) V...: Les oreilles du lièvre sont grandes.
- 5) V...: Les cornes du cerf sont longues.
- 6) V.....: La grenouille a de gros yeux.
- 7) V.....: L'hippopotame a de petites oreilles.
- 8) V.....: Les yeux de la chouette sont grands.
- 9) V.....: Le crabe a de grandes pattes.
- 10) V.....: Le chameau a de grosses bosses.

## Mixed words [- / E / S / ES]:

## MC 5

- 1) V...: L'anguille a une longue queue.
- 2) V..: Le raton-Laveur a les yeux noirs.
- 3) V..: Le bec du pélican est grand.
- 4) V..: Les bosses du chameau sont grosses.
- 5) V...: Le singe a de petits yeux.
- 6) V..: Le bec du pingouin est petit.
- 7) V..: Le corps de l'hippopotame est gros.
- 8) V..: Le chat a une queue noire.
- 9) V..: Les poils du bison sont longs.
- 10) V..: Le papillon a de grandes ailes.

## FI 2

Le raton-laveur a des yeux noirs.  
Le héron a un long bec.  
Le pingouin a un gros corps.  
Le merle a un corps noir.  
L'ours a de longs poils.  
L'épervier a un petit bec.  
La libellule a de gros yeux.  
Le gorille a de grands yeux.  
La girafe a un long cou.  
le singe a de petits yeux.

## FI 3

L'alouette a une petite tête.  
La libellule a de grandes ailes.  
Le lièvre a une queue noire.  
L'hirondelle a une longue queue.  
La souris a de longues oreilles.  
Le requin a une grande bouche.  
Le crabe a des pattes noires.  
La panthère a de petites oreilles.  
L'hippopotame a une grosse tête.  
Le chameau a de grosses bosses.

## FI 4

Les yeux du singe sont petits.  
Les ailes du papillon sont grandes.  
Le pélican a de grosses pattes.  
Les pattes de l'autruche sont longues.  
Le morse a de longues moustaches.  
La panthère a des pattes noires.  
Les poils du chat sont noirs.  
Le bison a de longs poils.  
Les cornes de la girafe sont petites.  
Les cornes de l'élan sont grandes.

## FI 5

Le lièvre a les pattes noires.  
Le lion a une grosse tête.  
Les ailes de la libellule sont longues.  
Le corps du merle est noir.  
Le héron a un long cou.  
Le cochon a une petite queue.  
Les yeux de la grenouille sont gros.  
L'écureuil a de petites pattes.  
La girafe est grande.  
La chouette a de grands yeux.



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The practice records contain all the answers tried out by the learners. Our current learner achieved a perfect score in the first exercise after having looked at the corresponding example and consulted the matching explanation, thereby using the program as it would have been presented to her in the Explicit mode. She was also able to state the rule at the end of the exercise :

Masc --> "le " if it's "Un". Fem--> "la" if it's "une".

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## **D2. EDITED EXAMPLE OF MANUAL SESSION NOTES:**

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### **D2a ) Experimenter's Comments:**

"The learner is good at navigating, following exercises and instructions, remembered all the rules and did very well, but is NOT VERY TALKATIVE".

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### **D2b ) Learners comments:**

#### \* Computer Experience:

"These kinds of computers are around the school. I don't normally use computers outside school"

#### \* Rule Knowledge after pre-test :

"Le, la , l' are words for 'the'. They have something to do with the word, I can't remember!!!.....I sound them out in my head to see if they are right".

#### \* Rule knowledge after post-test:

" 'L' is for vowels at the beginning of words and 'h' as well". " 'Le' is masculine, because its got 'un' in the sentence. 'La' is female, feminine".

#### \* Strategies for working out the answer:

When asked to explain how she arrived at her answer for question 8, she added: "It's 'le' because 'tête' is masculine. I can't tell for the 'le' and 'la's".

#### \* Impressions on program:

"I found it hard at first, then quite easy with the explanation. Then , no problems. I learnt about the "Le, la, l' " and some animal names . I ENJOYED IT. I would like it harder, more challenging."

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**D3. Score results for the Elision Module**

Names	Elision			Gender			Item Scores		
	Pre	Pst	IM	Pre	Pst	IM	Pre	Pst	IM
<b>IMPLICIT</b>									
George	90	100	100	14	100	100	40	100	100
Barnes	100	70	-30	50	100	50	70	70	--
Michael	50	80	60	29	75	65	30	60	43
Jaron	10	90	89	66	40	-76	10	60	56
Limpa	60	30	-75	57	43	-33	40	20	-33
Jane	90	100	100	89	100	100	80	100	100
Sarah	90	100	100	57	100	100	70	100	100
McDonald	70	90	67	57	40	-40	50	60	20
Sophie	70	100	100	57	67	23	60	80	50
Anything	80	90	50	25	100	100	40	90	83
Mary	30	100	100	80	100	100	30	100	100
<b>AVERAGES:</b>	<b>67</b>	<b>86</b>	<b>58</b>	<b>53</b>	<b>79</b>	<b>55</b>	<b>47</b>	<b>76</b>	<b>55</b>
<b>EXPLICIT</b>									
Yorkshire Pud	40	50	17	38	57	31	20	30	13
LC	80	100	100	67	50	-52	50	70	40
Paul Merson	60	60	-	50	33	-34	40	40	-
Arsenal SH	80	100	100	63	100	100	50	100	100
Mark Peters	40	70	50	33	90	85	20	70	63
David Connor	60	100	100	50	100	100	40	100	100
Peter James	90	100	100	57	100	100	60	100	100
Ashley Some	60	50	-25	38	33	-8	20	30	13
Robert Smith	90	40	-500	40	63	38	60	30	-75
Chris Cross	90	100	100	71	83	41	80	80	-
Zak	60	100	100	50	7	14	40	70	50
<b>AVERAGES:</b>	<b>68</b>	<b>79</b>	<b>34</b>	<b>51</b>	<b>70</b>	<b>39</b>	<b>44</b>	<b>65</b>	<b>20</b>
<b>EXPLORATORY</b>									
Ian Crook	60	100	100	0	100	100	0	100	100
Tony Adams	30	90	86	43	100	100	20	90	88
Arsenal Gunners	80	100	100	67	100	100	70	100	100
Paul Cooper	60	50	-25	50	50	-	40	50	17
Green	17	60	-33	80	40	-200	60	20	-100
Jus	60	100	100	57	100	100	20	100	100
Football	60	100	100	25	67	56	30	80	71
Georgina Rose	50	100	100	11	100	100	10	100	100
ShaniceJames	50	100	100	29	100	100	20	100	100
Dad	60	90	75	33	100	100	30	90	86
<b>AVERAGES:</b>	<b>58</b>	<b>89</b>	<b>55</b>	<b>40</b>	<b>90</b>	<b>83</b>	<b>30</b>	<b>83</b>	<b>76</b>